

SYNOPSYS, INC. (SNPS)

September 23, 2024

Technology – Electronic Automated Design (EAD) Software

Stock Rating

SELL

Investment Thesis

We recommend a SELL rating for Synopsys Inc. (SNPS) due to its current overvaluation. The stock is trading at a 17.8% premium relative to a target price of \$417 based on a DCF analysis. Despite strong growth drivers such as AI, cloud computing, and IoT, which boost demand for its electronic design automation (EDA) tools, the stock's high valuation limits further upside potential.

Drivers of Thesis

- **AI and Advanced Chip Design:** Synopsys is well-positioned to benefit from the need for high-performance, energy-efficient chips to power AI and cloud computing workloads.
- **Expanding Design IP Business:** Design IP is Synopsys's fastest-growing segment, with expected sustained demand from sectors like cloud computing, automotive electrification, IoT, and AI. The forecasted 13.5% CAGR through 2033 will increase its share of total sales from 26.4% to 31%.
- **Margin Expansion:** Synopsys is poised for margin improvements, particularly in its Design IP segment, which naturally has a higher margin. Operating margins are forecast to grow as economies of scale are realized, and cost efficiencies in R&D and sales are expected to improve the bottom line.

Risks to Thesis

- **Geopolitical Tensions with China:** China is a significant market that accounts for 15% of sales. Geopolitical tensions, particularly the U.S. export restrictions on advanced computing chips, pose a risk to growth in this region. Any escalation in trade restrictions could further reduce sales or limit Synopsys's access to the Chinese market.
- **Semiconductor R&D Investment:** Synopsys's business relies heavily on the semiconductor industry's research and development (R&D) spending. A downturn in the semiconductor sector or reduced R&D budgets could negatively impact the Company's revenue growth.

Earnings Estimates

Year	2021	2022	2023	2024E	2025E	2026E
EPS	\$4.95	\$6.39	\$8.01	\$11.19	\$13.15	-
HF est.				\$8.99	\$11.31	\$13.64
Growth		29.1%	25.4%	12.2%	25.8%	20.6%

12 Month Performance



Target Price

\$400 - 420

Henry Fund DCF	\$417
Henry Fund DDM	\$237
Relative Multiple	\$541

Price Data

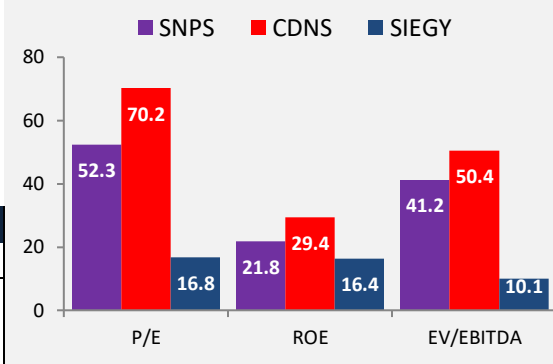
Current Price	\$507
52wk Range	\$441 – 629
Consensus 1yr Target	\$650

Key Statistics

Market Cap (\$B)	\$77.8
Shares Outstanding (M)	153.6
Institutional Ownership	0.4%
Beta	1.08
Dividend Yield	0.00%
Est. 5yr Growth	20.9%
Price/Earnings (TTM)	52.3
Price/Earnings (FY1)	56.4
Price/Sales (TTM)	12.2
Price/Book (mrq)	10.1

Profitability

Operating Margin	21.7%
Profit Margin	20.8%
Return on Assets (TTM)	8.6%
Return on Equity (TTM)	21.8%



Company Description

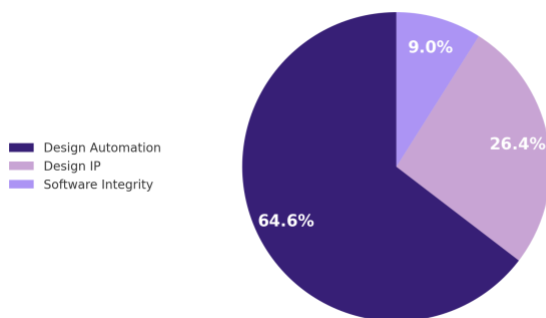
Synopsys Inc. is a leading provider of electronic design automation (EDA) software and IP solutions for the semiconductor industry. Its tools automate chip design, enabling faster, more accurate development. The Company operates in three main segments: Design Automation, Design IP, and Software Integrity.

COMPANY DESCRIPTION

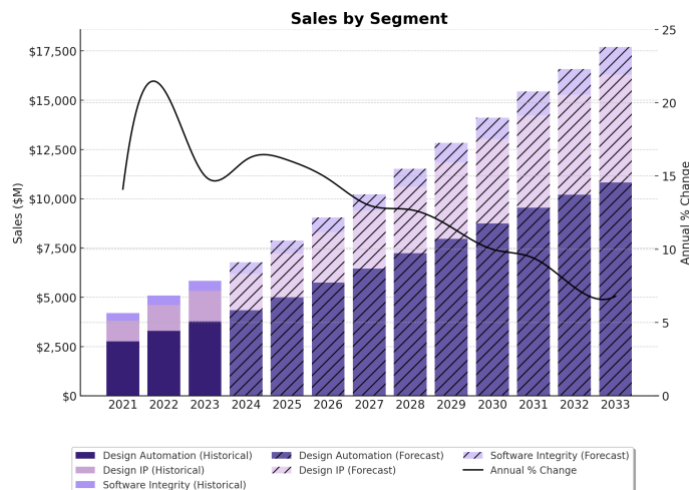
Synopsys, Inc.

Synopsys sells electronic design automation (EDA) software and related intellectual property to the semiconductor industry. EDA software automates various stages of chip development. Without EDA, the scale and complexity of the modern semiconductor industry could not exist. Customers and partners include Amazon, Intel, Micron, Microsoft, TSMC, NVIDIA, and more.^{1, 4} Synopsys also operates a software integrity business, helping organizations identify and resolve vulnerabilities in their software applications.

Sales by Segment (FY 2023)



Source: [Synopsys 10-K \(2023\)](#)



Source: [Synopsys 10-K \(2023\)](#)

Synopsys disaggregates revenue into three segments: Design Automation, Design IP, and Software Integrity. The Company changed its reporting segments in 2021, bifurcating Semiconductor & System Design into Design Automation and Design IP. We forecast strong growth across all segments over the projected period. Artificial intelligence (AI), cloud computing, internet-of-things (IoT),

and automotive electrification are the basis for our investment thesis. In short, the world is destined to become more digital, and Synopsys is well-aligned to capture this value.

The Company's revenue is recurring and high-margin but reliant on industry R&D. Customers pay a licensing fee to access Synopsys's EDA software. The average contract is paid in equal installments over three years. As of July 2024, the Company had a backlog of \$7.9 billion in performance obligations, including \$1.2 billion in non-cancellable commitments.

Revenue Segments

Design Automation: This includes the EDA business, which accounts for the largest percentage of sales at 64.6%. EDA tools automate otherwise slow and error-prone steps in the chip manufacturing process. For example, engineers previously wrote logic gates by hand and physically mapped every transistor on the chip. The room for error was non-existent, and manufacturing diligence often came at the expense of speed, volume, and complexity.

Today's engineers accomplish these tasks faster and more accurately using EDA software resulting in chips with billions of transistors each the width of a few nanometers. A human hair is approximately 80 to 100 thousand nanometers wide.⁶ Given the positive relationship between transistor density and processing power, EDA enables chip performance once considered impossible.

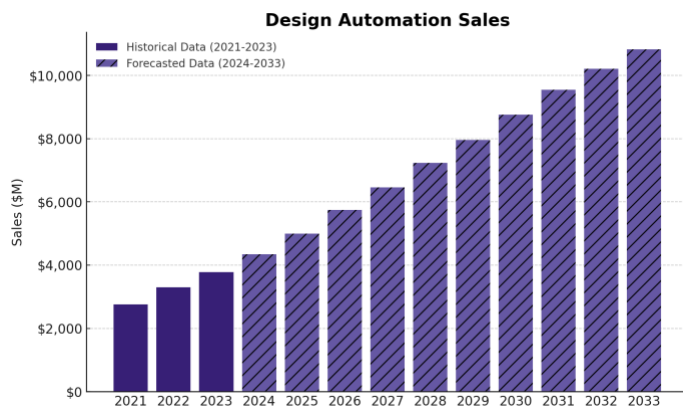
Per Synopsys, EDA serves three important roles in getting a chip to market:

1. **Technology Computer-Aided Design (TCAD):** Tools used to design and validate a chip's physical performance.² TCAD includes computer simulations to test the electrical behavior of transistors and other semiconductor components without physically building the chip.
2. **Design for Manufacturability (DFM):** Tools used to verify that a chip's design will meet the fabricator's manufacturing tolerances. This step involves validating the spacing, stacking, and placement of transistors and other components on the chip.
3. **Silicon Lifecycle Management (SLM):** Monitoring the performance of the device from post-

manufacturing tests to deployment in the field. The goal is to ensure the device continues to perform as expected throughout its lifetime.²

We anticipate strong growth in Design Automation, driven by the proliferation of AI and the increasing digitization of the global economy. The exceptional computing power required for AI training and inference will spur efforts to improve transistor density. Additionally, making AI economically viable will require more energy-efficient chips. Given AI's economic significance, these factors will be powerful tailwinds for Design Automation sales.

Our model assumes a CAGR of 11.1% through 2033. While growing, Design Automation is forecasted to decrease as a percentage of total sales from 65% to 61% in 2033.



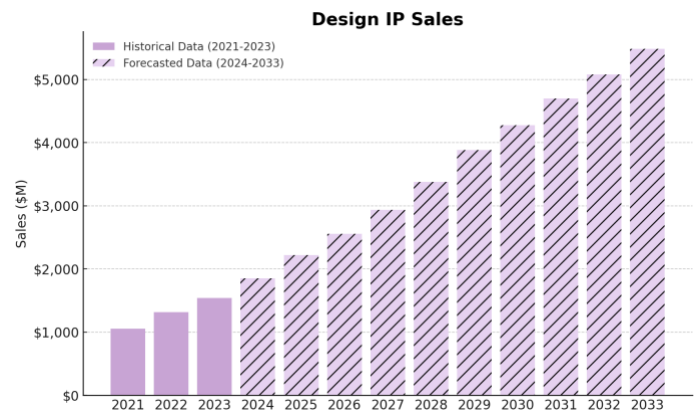
Source: [Synopsys 10-K \(2023\)](#)

Design IP: Design IP is Synopsys's second-largest revenue segment. It offers a broad portfolio of pre-designed modules and circuitry, providing a faster and more cost-effective alternative to internal development. This portfolio includes wired and wireless interfaces such as USB, Ethernet, HDMI, and Bluetooth. It also features logic libraries, neural network processors, security software, automotive IP, and system-on-a-chip (SoC) infrastructure. By licensing these modules, companies can significantly reduce the time and expense to bring chips to market.

Design IP is a fast-growing revenue segment with a 19% CAGR from 2015 to 2023.³ In 2023, the segment reported \$1.54 billion in revenue, up 17% YoY but slightly lower than the 25% growth incurred in 2022. Growth is driven by an extensive portfolio of IP solutions for markets like mobile, automotive, IoT, and cloud computing, enabling faster development of advanced SoCs. The increasing convergence of functions into single chips and multi-die

systems continues to boost demand for proprietary and third-party IP.

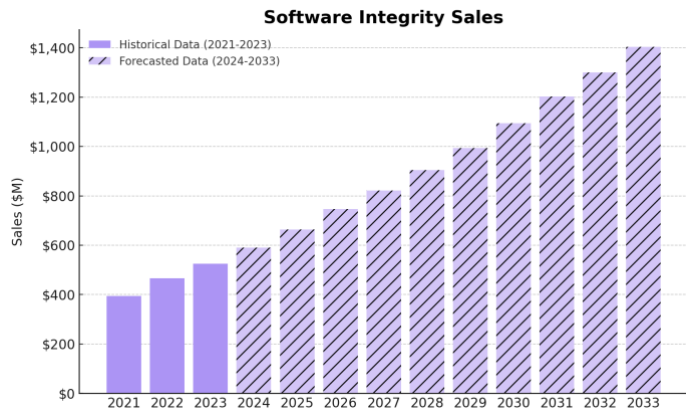
We expect Design IP to sustain strong growth as the demand for semiconductor solutions that support cloud computing, AI, IoT, and automotive digitization grows. Our model forecasts a CAGR of 13.5% through 2033. We project this segment to amass a greater share of total sales, increasing from 26.4% to 31% by 2033.



Source: [Synopsys 10-K \(2023\)](#)

Software Integrity: This segment provides tools and services for testing software code to detect vulnerabilities, defects, and compliance issues throughout development. It caters to various industries, including electronics, financial services, automotive, medicine, energy, and industrials. The Software Integrity segment's operating margin has also improved significantly, rising to 15% in 2023, up from 10% in 2022. This reflects better operational efficiency and a growing customer base.

Software Integrity has shown consistent growth over the past few years. In 2023, the segment generated \$524.6 million in revenue, or 12.6% of sales. In 2023, the segment grew 13%, albeit down from the 18% growth rate in 2022. We project a CAGR of 10.3% through 2033. Due to faster growth in other parts of the business, Software Integrity is expected to fall 110 bps to 7.9% as a percentage of sales.

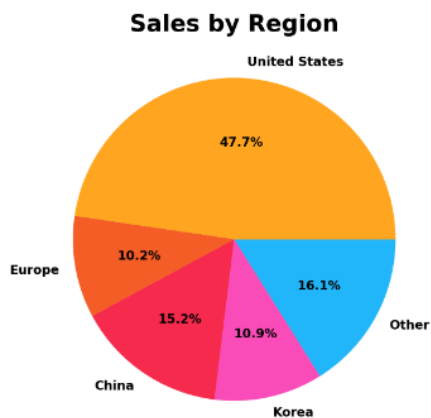


Source: [Synopsys 10-K \(2023\)](#)

Regional Segments

Synopsys's regional sales data from 2021 to 2023 shows significant growth, driven by rising demand for its software and IP products in the semiconductor and electronics sectors. During this period, revenue increased by 42.7% in the U.S., 57.5% in China, and 48.5% in Korea. Europe grew by 35.1%, while other regions posted a 14.4% increase. China's growth, now accounting for 15.2% of sales, reflects its focus on semiconductor self-reliance despite trade tensions with the U.S.

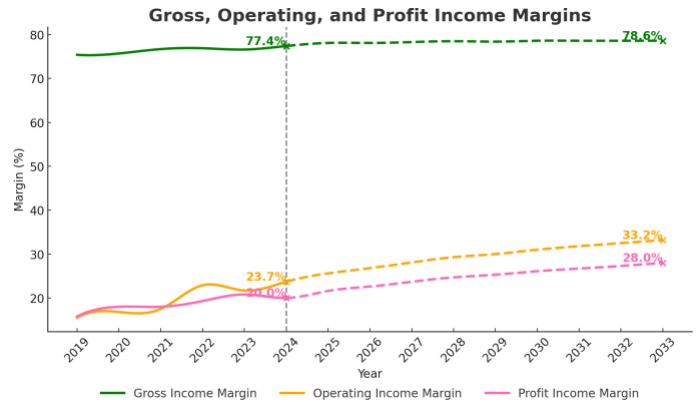
The U.S. remains Synopsys's largest market. From 2021 to 2023, U.S. revenue grew at a CAGR of 19.5%, driven by investments in chip design, AI, and cloud technologies. Korea, home to major semiconductor companies like Samsung and SK Hynix, saw a CAGR of 21.9%. China, despite regulatory challenges, achieved the highest CAGR at 25.5%. This growth reflects the increasing importance of the Asia-Pacific region, where electronics manufacturing fuels demand for Synopsys's products.



Source: [Synopsys 10-K \(2023\)](#)

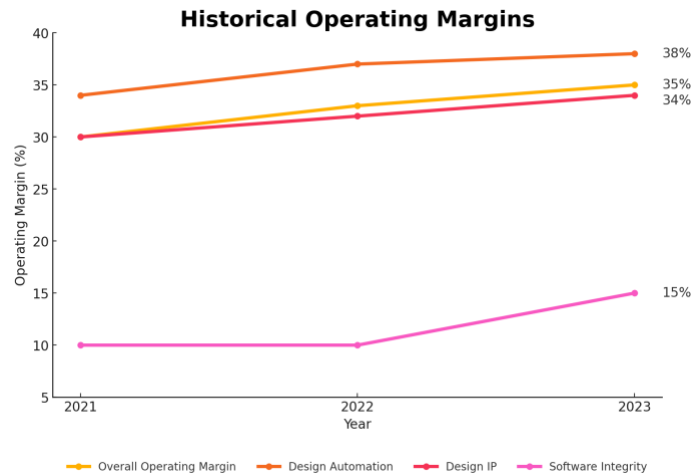
Cost Structure and Profitability

In fiscal 2023, Synopsys delivered strong financial performance, with revenue growing 15% to \$5.84 billion, driven by increased demand across its Design Automation, Design IP, and Software Integrity segments. We attribute this growth to AI, cloud computing, and digitization. Despite rising costs from employee expansion and acquisitions, Synopsys maintained efficiency, leading to a 9% increase in operating income and a 25% jump in net income to \$1.2 billion.



Source: [Synopsys 10-K \(2023\)](#)

Margins continue to improve as the business expands its distributable software model. We forecast further margin improvement as the business further leverages economies of scale.



Source: [Synopsys 10-K \(2023\)](#)

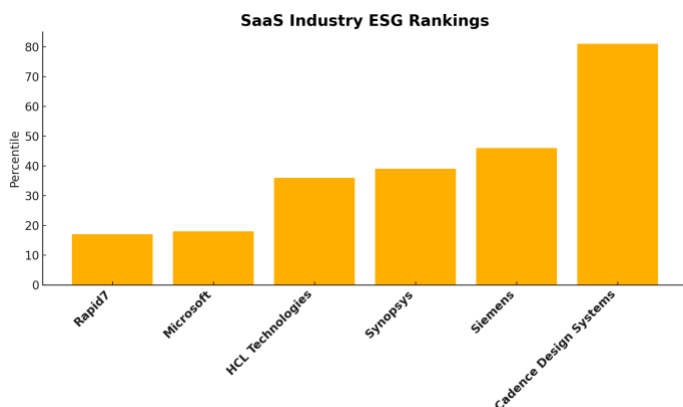
Debt Maturity Analysis

Synopsys maintains a conservative capital structure with minimal debt. The Company has no short-term obligations and only \$15.6 million in long-term debt. We do not

foresee liquidity issues, given the lack of short-term debt. The Company's \$1.8 billion cash is plenty to service its long-term obligations. Comparatively, Cadence Design Systems, Synopsys's closest competitor, holds \$1.3 billion in short and long-term debt.

ESG Analysis

Synopsys ranks in the 39th percentile, earning the Company an "Average" ESG rating.⁷ The chart below compares Synopsys with others in the industry. Notably, Synopsys lags behind its competitor, Cadence Design Systems, which ranks above average in the 81st percentile.



Source: [FactSet](#)

The Company's Board comprises 11 members, 73% of whom are men. Across the Board, 81% are deemed independent. Regarding management, men comprise 69% of the leadership team, and insiders own roughly 0.4% of the Company.⁷

The Company has a dedicated team overseeing its Smart Future ESG Strategy. The team recommends policies to the Board based on its six priority areas: human capital management, innovation, cybersecurity and data privacy, corporate governance and ethics, climate change and GHG emissions, and supply chain management.⁸

RECENT DEVELOPMENTS

Q3 FY24 Earnings

Synopsys reported strong financial performance, with total revenue reaching \$1.53 billion in the quarter, a 12.7% increase YoY. The Company's quarterly gross profit improved to \$1.24 billion, with gross margins climbing 20 bps to 80.9% YoY.¹⁰

Operating expenses increased to \$874.9 million, compared to \$793.9 million in the prior year. The primary drivers were higher R&D spending and increased SG&A costs. Q3 adjusted operating margin improved 400 bps YoY to 40%. Quarterly net income totaled \$404.9 million, up from \$333.1 million in the previous year.

Design Automation accounted for 66.9% of total revenue. While this segment remains the largest, its share of total revenue decreased to 71.8% in the same quarter last year, indicating slower growth relative to other areas of the business, notably Design IP. Adjusted operating margin for this segment held constant at 41%.

Design IP showed strong growth, contributing 30.4% of total revenue. This represents a notable increase from 25.9% in the same period last year. Adjusted operating margin was 37%, a significant improvement from 24% in Q3 2023.

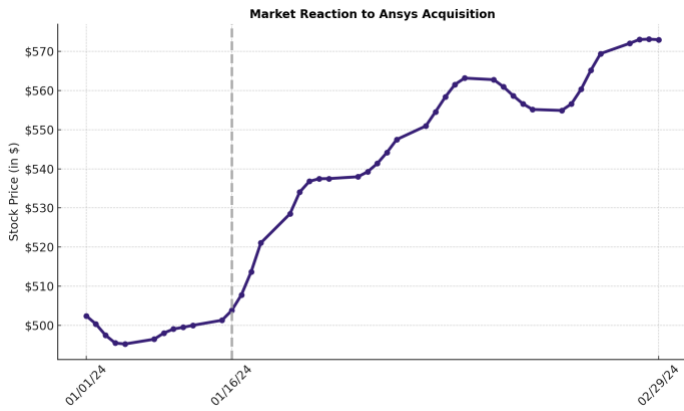
While the Design Automation segment continues to dominate, the Design IP segment is growing rapidly and gaining a larger share of Synopsys's overall revenue mix.

Ansys, Inc. Acquisition

On January 16, 2024, Synopsys announced a \$35 billion acquisition of Ansys, Inc., an engineering simulation and analysis software firm, using its stock as consideration. Shareholders approved the merger in May 2024, and the deal is expected to close in the first half of 2025.

The deal is opportunistic for Synopsys, given the synergies between Synopsys's EDA tools and Ansys' simulation software, as both are used to validate chip architecture. The deal aims to address the growing complexity of chip systems by integrating electronics and physics augmented with AI. It is expected to increase Synopsys's total addressable market by 1.5x to \$28 billion.⁹ Synergies are estimated to be \$400 million in cost savings and revenue gains.

The market responded favorably, pushing Synopsys's stock up by 3.1% on the announcement day. As seen in the chart below, positive performance continued through February.



Source: [FactSet](#)

New CEO

Synopsys, Inc. announced that Sassine Ghazi became its new President and CEO, effective January 1, 2024. Aart de Geus, Synopsys's co-founder and former CEO, transitioned to Executive Chair of the Board. Ghazi has been with the Company for over 25 years and served as President and COO. His background is in chip design, sales, marketing, and customer success. De Geus expressed confidence in Ghazi's leadership, praising his operational expertise, strong customer relationships, and innovative mindset. The leadership transition followed a multi-year succession plan, with the Board fully supporting Ghazi's promotion.¹⁴

INDUSTRY TRENDS

Artificial Intelligence

AI is poised to boost productivity across the economy rapidly. One of the most useful applications today is generative AI, which creates novel content like text, images, code, audio, and video. Large language models (LLMs) like OpenAI's GPT-4, the engine behind ChatGPT, are an example.

Training advanced models is becoming increasingly slow and expensive, raising concerns about the industry's economic viability if current trends persist. Companies like Meta, Google, and OpenAI are driving this compute surge, with their models requiring more power at a rate that outpaces Moore's Law, creating an urgent need for hardware optimization.

This rising demand for computing power will fuel the need for EDA services. Optimizing chip performance is critical to handle advanced AI models' growing computational demands.

Accordingly, the EDA industry is well-positioned to capitalize on the growing demand for computing by optimizing semiconductor design. As AI companies train increasingly complex models, EDA tools will improve chip design efficiency, reducing development time and energy costs. AI-driven EDA solutions can automate key design tasks, optimize performance for AI workloads, and scale across various manufacturing stages. This synergy between EDA and AI will accelerate design iterations and lower costs, making advanced AI model development more accessible.

Beyond improving the chips that power AI, Synopsys is incorporating the technology into its Synopsys.ai suite. This platform integrates machine learning to automate and optimize critical stages of chip design, improving efficiency and shortening time-to-market for complex projects. For example, machine learning algorithms are being used to optimize the placement of transistors to improve performance and density. Tools like DSO.ai (Design Space Optimization) streamline design exploration, while VSO.ai and TSO.ai enhance verification and testing. These AI-powered solutions enable superior power, performance, and area optimization, accelerating the development of advanced chips critical for AI.

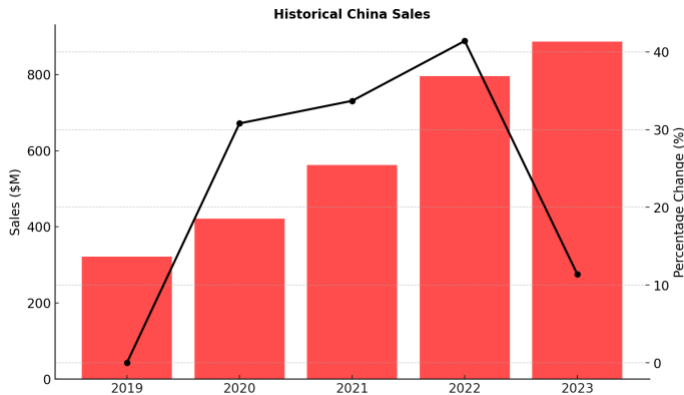
China

China is a growing market for EDA software and a large contributor to sales for Synopsys and Cadence Design Systems, a close competitor. In fiscal year 2023, China accounted for 15% and 17% of each firm's respective sales. Synopsys's China sales grew 11% YoY to \$886 million, making it the largest market outside the U.S. For Cadence, China sales increased 30% YoY to \$680 million, rendering the country its third-largest market by revenue.

Despite growing China sales across the industry, geopolitical tensions with the U.S. and its Western allies and a push for Sino-sufficiency in the semiconductor industry threaten to upend this market. U.S. export regulations implemented in October 2022, limiting China's access to advanced computing chips and semiconductor manufacturing tools, may prove hostile to further growth.

While Synopsys does not anticipate these restrictions materially impacting its business in the near term, the Company is closely monitoring changes that could disrupt customer demand. As seen in the chart below for

Synopsys's China sales, annualized growth slowed significantly to 11% compared to prior years. Recent performance reiterates this concern. In Q3 2024, China accounted for \$266.7 million, or 17.5% of total revenue. This is an 8.7% decrease relative to Q3 2023. Synopsys cites macroeconomic factors as the primary cause of this softer performance but notes that entity list and trade restrictions are contributing factors.¹⁵



Source: [Synopsys 10-K \(2023\)](#)

Cloud EDA

The EDA industry is increasingly shifting toward cloud-based solutions, driven by the scalability and flexibility cloud computing provides for chip design processes. In response to this trend, Synopsys has introduced cloud-based EDA tools, including the industry's first EDA Software-as-a-Service (SaaS) solution developed in collaboration with Microsoft Azure. Previously, companies needed to invest in hardware to meet the computational demands of EDA software, but cloud services now eliminate that requirement.

Cloud EDA offers several key advantages: it allows companies to scale computing resources as needed during design peaks, significantly lowering the cost of hardware ownership. By accessing powerful cloud computing, companies can accelerate simulations and design iterations, reducing time to market. Cloud-based tools also improve collaboration, enabling globally dispersed teams to work on the same projects in real-time. In addition, companies benefit from automatic access to the latest software versions without manual updates, enhanced security provided by cloud vendors, and efficient resource use, which reduces waste and environmental impact. These features make cloud EDA a valuable solution for modern chip design.

MARKETS AND COMPETITION

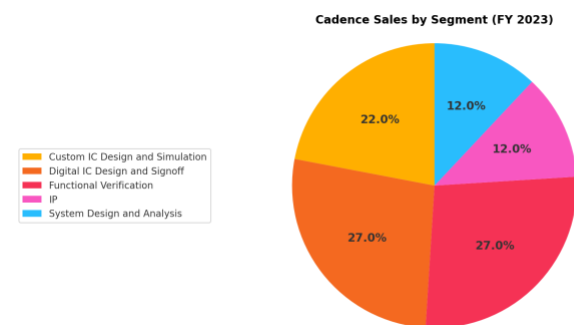
The EDA industry is dominated by three firms: Synopsys, Cadence Design Systems, and, to a lesser extent, Siemens AG. Synopsys is the largest player with a 15.2% market share, followed by Cadence (9.7%) and Siemens (3%).¹¹ The software distribution model provides the industry an average net margin of 16%.¹¹ The industry's historical five-year CAGR is 9.5%, driven by increased spending on R&D and growing IP sales.¹¹

Peer Comparisons

As of 9/21/24	Synopsys	Cadence	Siemens
Market cap	\$77.8B	\$75.0B	\$146.9B
EV	\$76.5B	\$75.3B	\$181.9B
Trailing P/E	52.3x	70.1x	16.8x
Forward P/E	33.8x	39.7x	15.3x
P/S	12.2x	18.0x	1.7x

Source: Yahoo! Finance

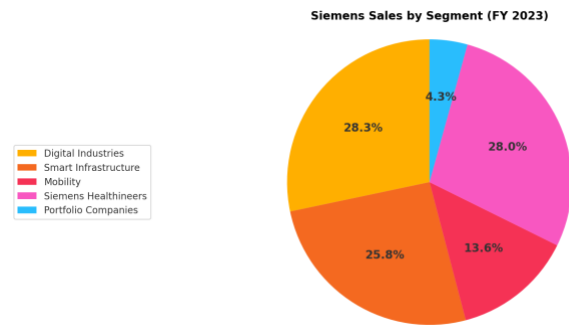
Cadence Design Systems: In 2023, Cadence achieved a total revenue of \$4.1 billion, representing a 15% YoY growth driven by strong demand for its software and emulation hardware, with significant growth in China (30%) and Other Asia (22%). Operating margins improved to 31%, up from 30% in 2022, as revenue growth outpaced operating expense increases. R&D expenses rose by 15%, contributing to a 13% rise in total operating expenses to \$2.4 billion. Recurring revenue made up 84% of total revenue, while up-front revenue, boosted by hardware sales, increased to 16%.¹²



Source: [Cadence](#)

Siemens AG: In fiscal year 2023, Siemens' Digital Industries division, home to its EDA business, played a crucial role in the Company's strong financial performance. The EDA business contributed significantly to the 27% profit growth in Digital Industries, which posted a 22.6% profit margin,

up from 19.9% the previous year. Revenue in the EDA business grew by 10%, driven by large contract wins, making it a key factor in the division's success. Siemens, a German multinational, saw overall revenue growth of 8% in 2023.¹³



Source: [Siemens](#)

Performance Comparisons

	Synopsys	Cadence	Siemens
Revenue	\$5.8B	\$4.1B	€72B
Gross Margin	76.2%	88.9%	38.1%
Operating Margin	23.7%	31.2%	12.3%
Profit Margin	21.0%	25.5%	10.2%
ROA	12.5%	19.3%	5.4%
ROE	21.1%	33.9%	16.4%
ROIC	19.1%	28.3%	8.8%

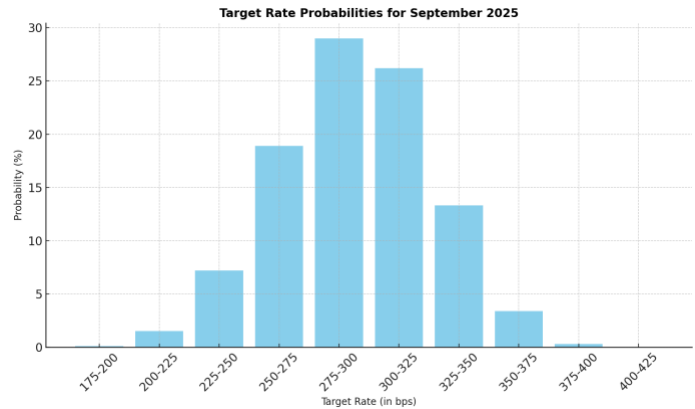
Source: FactSet

Synopsys lags in margin performance compared to Cadence due to higher operating expenses, particularly in R&D and employee-related costs, as well as its reliance on lower-margin hardware products such as emulation and prototyping systems. Siemens's performance metrics are a function of its broad portfolio as a technology conglomerate. Siemens sells a more extensive mix of hardware in addition to its software businesses. Compared to Synopsys and Cadence, which are more pure-play software companies, the relative mix drags on performance. Concerning valuation, Cadence's superior margin performance explains the relative premium afforded by the market compared to Synopsys.

ECONOMIC OUTLOOK

Interest Rates: On September 18, 2024, the Federal Reserve cut interest rates by 50 bps, bringing the federal funds target range to 4.75 – 5.00%.¹⁶ The cut marks a turning point in the Fed's campaign to cool inflation, which

peaked at 9.1% in 2022. Looking forward 12 months, the market is expecting further rate cuts, with a plurality viewing the target range as 2.75 – 3.00%. The chart below shows the distribution of expectations.



Source: [CMEGroup](#)

Provided Synopsys's capital structure comprises little to no debt, we view the rate cut as mostly affecting the Company's valuation. This is especially true since most of the FCF is generated in later years, which are most impacted by the discount rate. Should the market be correct, we expect the value of Synopsys's equity to rise as further cuts go into effect.

Beyond valuations, we also see the rate cut stimulating demand for EDA services, directly tied to R&D spending. Cheaper capital makes these investments more affordable, which in turn will increase demand for Synopsys's services.

VALUATION

Optimism about AI's future underpins our growth targets. As AI matures and integrates into various sectors—from healthcare and finance to manufacturing and autonomous systems—the demand for specialized chips will surge. These chips must be highly optimized for specific tasks, pushing engineers to extract maximum performance from each design. This shift will require faster chips and more efficient designs tailored to meet the unique requirements of different applications. To achieve this level of precision, engineers will increasingly turn to Synopsys's suite of tools and services, which are essential for ensuring that these custom chip designs are both functional and scalable.

	2024E	2025E	2026E	2027E	2028E
Design Automation	15.0%	15.0%	15.0%	12.5%	12.0%
Design IP	20.0%	20.0%	15.0%	15.0%	15.0%
Software Integrity	12.5%	12.5%	12.5%	10.0%	10.0%

Operating Expenditures

Cost of Revenue: The model uses the previous year's cost of revenue for each reported segment. We hold that percentage constant over the forecasted period. Amortization of intangibles tails off in 2029, causing gross margin to improve in 2030 and beyond. Gross margins settle at 78.6% in 2033, up 200 bps from 2023. The forecasted margin improvement reflects Design IP, a naturally high-margin product, becoming a greater share of total sales due to its fast growth relative to other segments.

R&D: We forecast R&D decreasing as a percentage of total sales through 2033. We believe economies of scale, especially the sale of Design IP, will accelerate growth faster than the Company's investments in R&D require. To reflect this, our model decreases R&D as a percentage of sales by 50 bps annually through 2033, ending at 28.8%.

Sales and Marketing: Like R&D, we forecast decreasing Sales and Marketing expenses as a percentage of total sales. In particular, we decrease this expense by 25 bps each year through 2033, ending at 11.97% in 2033. Again, our rationale is improving margins as the business scales.

General and Administrative: As the business scales, general and Administrative expenses decrease by 15 bps yearly. 2033, this expense category is estimated to be 3.04% of sales.

Cost of Capital

The weighted average cost of capital (WACC) is 9.07%. Our WACC estimate incorporates the following assumptions:

- **Risk-Free Rate:** 3.7% – YTM 10Y US Treasury
- **Beta:** 1.08 – 5Y Monthly Beta (per Yahoo! Finance)
- **Equity Risk Premium:** 5.0% – Fund estimate
- **Cost of Equity:** 9.1% – CAPM
- **Equity Weight:** 99.34%

- **Pre-Tax Cost of Debt:** 4.8% – Bloomberg estimate
- **Marginal Tax Rate:** 16.0%
- **After-Tax Cost of Debt:** 4.03%
- **Debt Weight:** 0.66%

DCF/EP Model

Our DCF and EP models yielded a share price of \$400. The following assumptions were used:

- **CV Growth of NOPLAT:** 4.0%
- **CV Year ROIC:** 195.6% using ROIC from the last forecasted fiscal year (2033E)

The DCF/EP model is our preferred estimate of Synopsys's intrinsic value. The model best reflects the value of future investments in the business. At a current market price of \$507, our DCF/EP suggests the Company is trading at a premium of 17.8% compared to our price target of \$417. For this reason, we recommend a SELL rating.

Our DCF/EP model is sensitive to various factors, including WACC, NOPLAT CV growth rate, and beta. We attribute this sensitivity to the fact that a large percentage of the firm's value derives from its continuing value, which is sensitive to factors impacting the discount rate.

Fundamental P/E Model (DDM)

The DDM provides a price estimate of \$237, well below the current market price. We attribute this difference to the fact that Synopsys does not offer a dividend. Accordingly, the DDM does not accurately gauge the Company's fair value.

Relative Valuation (P/E) Model

Our relative valuation model uses the forward P/E of various software and digital infrastructure companies, including Ansys, Autodesk, Cadence Design Systems, Cloudflare, CrowdStrike, Palantir, Palo Alto Networks, and Workday.

Businesses operating within this segment are richly valued compared to future earnings. Based on 2024 consensus estimates found on FactSet, the industry has an average P/E of 60.2. Using this P/E multiple, our model derived a stock price of \$541 for Synopsys. Using the same process

but incorporating an average P/E based on 2025 industry estimates, our model yielded a stock price of \$583.

KEYS TO MONITOR

Synopsys is well-positioned to capitalize on key trends such as AI, cloud computing, and the increasing demand for advanced semiconductor chips. Synopsys's EDA tools and AI-powered platforms, like Synopsys.ai, align with the need for more efficient and powerful chips, particularly as AI workloads grow. A \$7.9B backlog in performance obligations also provides revenue stability and visibility.

However, risks remain. Geopolitical tensions, especially between the U.S. and China, could threaten Synopsys's growth, as China contributed 17.5% of Q3 2024 revenue. Further export restrictions or worsening trade relations could slow sales in this critical region, which analysts should monitor.

Valuation is another concern. Trading at a premium, the stock could face pressure if growth falls short or macroeconomic factors, such as reduced R&D spending, negatively impact performance.

Moving forward, investors should watch several key factors: the integration of Ansys, which is expected to yield \$400M in synergies, ongoing Design IP growth, and U.S.-China trade developments. Maintaining margin expansion while controlling costs will be crucial to justifying Synopsys's premium valuation. Underperformance in these areas may prompt a reassessment of the investment thesis. Conversely, a strong performance could reaffirm its growth trajectory and support its valuation.

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5. [Synopsys \(10K\)](#)
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DISCLAIMER

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Synopsys, Inc.

Revenue Decomposition

\$ in millions

Fiscal Years Ending Oct. 31	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E
Total revenue:													
Design automation	2,754.7	3,300.2	3,775.3	4,341.6	4,992.8	5,741.8	6,459.5	7,234.6	7,958.1	8,753.9	9,541.7	10,209.7	10,822.2
Growth rate (%)	19.8%	14.4%		15.0%	15.0%	15.0%	12.5%	12.0%	10.0%	10.0%	9.0%	7.0%	6.0%
% of revenue	65.5%	64.9%	64.6%	64.0%	63.4%	63.5%	63.2%	62.8%	62.0%	62.0%	61.8%	61.6%	61.1%
Design IP	1,055.7	1,315.5	1,542.7	1,851.2	2,221.5	2,554.7	2,937.9	3,378.6	3,885.4	4,273.9	4,701.3	5,077.4	5,483.6
Growth rate (%)		24.6%	17.3%	20.0%	20.0%	15.0%	15.0%	15.0%	15.0%	10.0%	10.0%	8.0%	8.0%
% of revenue	25.1%	25.9%	26.4%	27.3%	28.2%	28.2%	28.7%	29.3%	30.3%	30.3%	30.4%	30.6%	31.0%
Software integrity	393.8	465.8	524.6	590.2	663.9	746.9	821.6	903.8	994.2	1,093.6	1,203.0	1,299.2	1,403.1
Growth rate (%)	10.0%	18.3%	12.6%	12.5%	12.5%	12.5%	10.0%	10.0%	10.0%	10.0%	10.0%	8.0%	8.0%
% of revenue	9.4%	9.2%	9.0%	8.7%	8.4%	8.3%	8.0%	7.8%	7.7%	7.7%	7.8%	7.8%	7.9%
Total revenue	4,205.1	5,082.9	5,843.8	6,783.0	7,878.3	9,043.4	10,219.0	11,517.0	12,837.7	14,121.4	15,446.0	16,586.3	17,709.0
Growth rate (%)	14.1%	20.9%	15.0%	16.1%	16.1%	14.8%	13.0%	12.7%	11.5%	10.0%	9.4%	7.4%	6.8%

Synopsys, Inc.
Income Statement
\$ in millions

Fiscal Years Ending Oct. 31	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E
Revenue:													
Design automation	2,754.7	3,300.2	3,775.3	4,341.6	4,992.8	5,741.8	6,459.5	7,234.6	7,958.1	8,753.9	9,541.7	10,209.7	10,822.2
Design IP	1,055.7	1,315.5	1,542.7	1,851.2	2,221.5	2,554.7	2,937.9	3,378.6	3,885.4	4,273.9	4,701.3	5,077.4	5,483.6
Software integrity	393.8	465.8	524.6	590.2	663.9	746.9	821.6	903.8	994.2	1,093.6	1,203.0	1,299.2	1,403.1
Semiconductor & system design segment	-	-	-	-	-	-	-	-	-	-	-	-	-
Total revenue	4,204.2	5,081.5	5,842.6	6,783.0	7,878.3	9,043.4	10,219.0	11,517.0	12,837.7	14,121.4	15,446.0	16,586.3	17,709.0
Cost of revenue:													
Products	542.1	653.8	763.5	886.4	1,029.5	1,181.8	1,335.4	1,505.0	1,677.6	1,845.3	2,018.4	2,167.4	2,314.2
Maintenance and service	271.2	343.0	383.8	445.6	517.6	594.1	671.3	756.6	843.4	927.7	1,014.7	1,089.7	1,163.4
Depreciation	119.1	107.7	145.1	138.6	126.4	155.4	175.9	198.7	223.8	248.9	273.1	298.5	319.2
Amortization of intangible assets	48.5	66.9	74.9	65.4	53.7	45.3	32.5	16.4	24.2	-	-	-	-
Total cost of revenue	980.9	1,171.4	1,367.3	1,536.0	1,727.2	1,976.6	2,215.1	2,476.7	2,768.9	3,021.9	3,306.3	3,555.6	3,796.8
Gross income	3,223.3	3,910.1	4,475.3	5,247.0	6,151.1	7,066.8	8,003.9	9,040.3	10,068.7	11,099.5	12,139.8	13,030.7	13,912.2
Operating expenses:													
Research and development	1,504.8	1,680.4	1,946.8	2,260.2	2,585.7	2,922.9	3,251.8	3,607.2	3,956.7	4,281.8	4,606.2	4,863.3	5,103.9
Sales and marketing	712.5	779.8	889.0	1,032.1	1,159.4	1,285.6	1,401.7	1,522.1	1,664.5	1,795.7	1,925.5	2,026.2	2,119.1
General and administrative	203.9	246.1	265.2	297.7	334.0	369.8	402.6	436.4	467.2	492.7	515.8	529.0	538.2
Amortization of intangible assets	33.9	29.8	28.0	37.7	30.9	26.1	18.7	9.4	13.9	-	-	-	-
Restructuring charges	33.4	12.1	77.0	-	-	-	-	-	-	-	-	-	-
Total operating expenses	2,488.5	2,748.1	3,206.1	3,627.7	4,110.0	4,604.4	5,074.7	5,575.2	6,102.3	6,570.2	7,047.5	7,418.4	7,761.2
Operating income	734.8	1,162.0	1,269.2	1,619.3	2,041.1	2,462.3	2,929.2	3,465.2	3,966.4	4,529.3	5,092.3	5,612.3	6,151.0
Other income (expense), net	70.7	(46.5)	32.5	8.7	9.0	9.3	9.5	9.8	10.1	10.4	10.8	11.1	11.5
Income before income taxes	805.5	1,115.5	1,301.8	1,628.0	2,050.1	2,471.6	2,938.8	3,475.0	3,976.5	4,539.8	5,103.1	5,623.4	6,162.5
Provision (benefit) for income taxes	49.2	137.1	83.7	260.5	328.0	395.5	470.2	556.0	636.2	726.4	816.5	899.7	986.0
Net income	756.4	978.4	1,218.1	1,367.5	1,722.1	2,076.1	2,468.6	2,919.0	3,340.3	3,813.4	4,286.6	4,723.6	5,176.5
Common stock outstanding	152.7	153.0	152.1	152.2	152.3	152.2	152.2	152.2	152.2	152.2	152.2	152.2	152.2
Earnings per share	\$ 4.95	\$ 6.39	\$ 8.01	\$ 8.99	\$ 11.31	\$ 13.64	\$ 16.22	\$ 19.18	\$ 21.94	\$ 25.05	\$ 28.16	\$ 31.03	\$ 34.01

Synopsys, Inc.
Balance Sheet
\$ in millions

<i>Fiscal Years Ending Oct. 31</i>	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E
ASSETS													
Current assets:													
Cash and cash equivalents	1,432.8	1,417.6	1,438.9	4,624.7	6,478.6	8,690.7	11,390.9	14,356.0	17,752.6	21,560.8	25,833.8	30,513.3	35,626.3
Short-term investments	147.9	147.9	151.6	157.9	164.5	171.3	178.4	185.8	193.5	201.6	210.0	218.7	227.7
Accounts receivable, net	568.5	796.1	947.0	1,099.4	1,276.9	1,465.8	1,656.3	1,866.7	2,080.7	2,288.8	2,503.5	2,688.3	2,870.3
Inventories	229.0	211.9	325.6	338.1	388.8	447.1	503.0	563.3	619.7	681.6	743.0	795.0	842.7
Prepaid and other current assets	430.0	439.1	567.5	658.9	765.2	878.4	992.6	1,118.7	1,247.0	1,371.7	1,500.3	1,611.1	1,720.1
Total current assets	2,808.3	3,012.7	3,430.6	6,879.0	9,074.0	11,653.3	14,721.2	18,090.5	21,893.5	26,104.4	30,790.6	35,826.4	41,287.1
Property and equipment, net	472.4	483.3	557.3	508.4	625.0	707.1	798.8	899.8	1,000.7	1,098.0	1,200.1	1,283.5	1,369.9
Operating lease right-of-use assets, net	493.3	559.1	568.8	660.4	767.0	880.5	994.9	1,121.3	1,249.9	1,374.8	1,503.8	1,614.8	1,724.1
Goodwill	3,575.8	3,842.2	4,070.3	3,887.9	3,887.9	3,887.9	3,887.9	3,887.9	3,887.9	3,887.9	3,887.9	3,887.9	3,887.9
Intangible assets, net	279.1	386.4	374.2	271.1	186.5	115.1	63.9	38.1	-	-	-	-	-
Deferred income taxes	612.7	670.7	860.9	943.0	1,033.0	1,131.5	1,239.4	1,357.6	1,487.1	1,629.0	1,784.3	1,954.5	2,140.9
Other long-term assets	510.7	463.7	471.0	546.8	635.1	729.0	823.8	928.4	1,034.8	1,138.3	1,245.1	1,337.0	1,427.5
Total assets	8,752.3	9,418.1	10,333.1	13,696.5	16,208.4	19,104.3	22,529.9	26,323.6	30,553.8	35,232.5	40,411.8	45,904.1	51,837.4
LIABILITIES, REDEEMABLE NON-CONTROLLING INTEREST AND STOCKHOLDERS' EQUITY													
Current liabilities:													
Accounts payable and accrued liabilities	741.2	809.4	1,123.8	1,304.6	1,515.3	1,739.4	1,965.5	2,215.2	2,469.2	2,716.1	2,970.9	3,190.2	3,406.1
Operating lease liabilities, current	79.7	54.3	85.7	66.6	77.4	88.8	100.4	113.1	126.1	138.7	151.7	162.9	173.9
Short-term debt	75.0	-	-	-	-	-	-	-	-	-	-	-	-
Deferred revenue	1,517.6	1,910.8	1,776.0	2,061.9	2,394.8	2,749.0	3,106.3	3,500.9	3,902.3	4,292.5	4,695.2	5,041.8	5,383.1
Total current liabilities	2,413.5	2,774.5	2,985.5	3,433.1	3,987.5	4,577.2	5,172.2	5,829.2	6,497.6	7,147.3	7,817.8	8,394.9	8,963.1
Long-term operating lease liabilities	487.0	581.3	584.0	476.5	553.5	635.3	717.9	809.1	901.9	992.1	1,085.2	1,165.3	1,244.2
Long-term deferred revenue	136.3	154.5	175.1	203.3	236.1	271.1	306.3	345.2	384.8	423.3	463.0	497.2	530.8
Long-term debt	25.1	20.8	18.1	20.6	22.1	23.7	25.4	27.2	29.1	31.1	33.2	35.0	36.9
Other long-term liabilities	391.4	327.8	386.1	448.3	520.7	597.7	675.4	761.2	848.4	933.3	1,020.8	1,096.2	1,170.4
Total liabilities	3,453.3	3,858.9	4,148.8	4,581.9	5,319.9	6,105.0	6,897.2	7,771.9	8,661.9	9,527.1	10,419.9	11,188.5	11,945.4
Redeemable non-controlling interest	-	38.7	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Shareholders' equity:													
Common stock	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Capital in excess of par value	1,576.4	1,487.1	1,276.2	1,328.0	1,379.8	1,414.6	1,414.6	1,414.6	1,414.6	1,414.6	1,414.6	1,414.6	1,414.6
Retained earnings	4,549.7	5,534.3	6,741.7	8,109.2	9,831.3	11,907.4	14,376.0	17,295.0	20,635.3	24,448.7	28,735.2	33,458.9	38,635.4
Treasury stock, at cost	(782.9)	(1,273.0)	(1,675.7)	(164.8)	(164.8)	(164.8)	-	-	-	-	-	-	-
Accumulated other comprehensive income (loss)	(49.6)	(234.3)	(196.4)	(196.4)	(196.4)	(196.4)	(196.4)	(196.4)	(196.4)	(196.4)	(196.4)	(196.4)	(196.4)
Total Synopsys stockholders' equity	5,295.1	5,515.7	6,147.3	9,077.6	10,851.5	12,962.4	15,595.7	18,514.7	21,854.9	25,668.3	29,954.9	34,678.6	39,855.1
Non-controlling interest	3.8	4.8	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Total liabilities and shareholders' equity	8,752.3	9,418.1	10,333.1	13,696.5	16,208.4	19,104.3	22,529.9	26,323.6	30,553.8	35,232.5	40,411.8	45,904.1	51,837.4

Synopsys, Inc.
Historical Cash Flow Statement

\$ in millions

Fiscal Years Ending Oct. 31	2019	2020	2021	2022	2023
Cash flows from operating activities:					
Net income	532.4	663.4	756.4	978.4	1,218.1
Adjustments to reconcile net income to net cash provided by operating activities:					
Amortization and depreciation	201.7	210.0	203.7	228.4	247.1
Reduction of operating lease right-of-use assets	-	82.9	86.6	89.5	97.7
Amortization of capital costs to obtain revenue contract	62.8	61.2	64.7	73.0	82.2
Stock-based compensation	155.0	248.6	345.3	459.0	563.3
Allowance for credit losses	11.7	20.9	18.5	(3.5)	19.9
Deferred income taxes	(82.6)	(111.5)	(128.6)	(36.9)	(211.0)
Other non-cash	(5.0)	4.3	15.9	10.2	13.3
Net changes from operating assets and liabilities, net of acquired assets and assumed liabilities:					
Accounts receivable	(8.6)	(236.8)	201.7	(251.4)	(178.4)
Inventories	(17.4)	(55.0)	(48.0)	1.3	(123.8)
Prepaid and other current assets	(49.8)	(11.3)	(102.2)	(90.0)	(106.4)
Other long-term assets	(125.7)	(83.4)	(153.0)	(15.3)	(100.6)
Accounts payable and accrued liabilities	(19.3)	113.8	125.1	(34.1)	170.5
Operating lease liabilities	-	(78.6)	(82.6)	(85.8)	(73.3)
Income taxes	19.8	14.1	28.9	1.6	198.1
Deferred revenue	125.7	148.7	160.3	414.3	(113.4)
Net cash provided by operating activities	800.5	991.3	1,492.6	1,738.9	1,703.3
Cash flows from investing activities:					
Proceeds from sales and maturities of short-term investments	-	-	12.9	93.7	130.4
Purchases of short-term investments	-	-	(161.7)	(97.2)	(131.1)
Proceeds from sales of long-term investments	6.4	2.2	-	0.6	8.5
Purchases of long-term investments	(3.2)	(2.8)	(7.6)	(7.0)	(0.4)
Purchases of property and equipment	(198.1)	(154.7)	(93.8)	(136.6)	(189.6)
Acquisitions, net of cash acquired	(36.6)	(201.0)	(296.0)	(422.4)	(297.7)
Capitalization of software development costs	(4.3)	(4.0)	(2.0)	(2.5)	(2.2)
Other	-	-	(0.8)	(1.2)	-
Net cash used in investing activities	(235.9)	(360.4)	(549.0)	(572.6)	(482.1)
Cash flows from financing activities:					
Repayment of debt	(524.1)	(288.9)	(28.1)	(76.8)	(2.6)
Issuances of common stock	156.4	197.4	210.7	238.0	253.0
Payments for taxes related to net share settlement of equity awards	(57.1)	(82.2)	(138.9)	(174.0)	(241.4)
Purchase of equity forward contracts	-	-	(35.0)	-	(45.0)
Purchases of treasury stock	(329.2)	(242.1)	(753.1)	(1,100.0)	(1,160.7)
Other	(0.8)	(1.3)	(4.4)	(3.4)	(0.1)
Net cash used in financing activities	(754.8)	(417.1)	(748.7)	(1,116.3)	(1,196.9)
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	2.8	17.2	2.4	(65.3)	(3.0)
Net change in cash, cash equivalents, and restricted cash	(187.4)	231.0	197.2	(15.3)	21.3
Cash, cash equivalents, and restricted cash, beginning of year	725.0	730.5	1,238.0	1,435.2	1,419.9
Cash, cash equivalents, and restricted cash, end of year	730.5	1,238.0	1,435.2	1,419.9	1,441.2

Synopsys, Inc.
Forecasted Cash Flow Statement

\$ in millions

Fiscal Years Ending Oct. 31	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E
Cash and cash equivalents at beginning of period	1,438.9	4,624.7	6,478.6	8,690.7	11,390.9	14,356.0	17,752.6	21,560.8	25,833.8	30,513.3
CASH FLOWS FROM OPERATING ACTIVITIES										
Net income	1,367.5	1,722.1	2,076.1	2,468.6	2,919.0	3,340.3	3,813.4	4,286.6	4,723.6	5,176.5
Adjustments to reconcile net income to cash from operating activities:										
Depreciation	138.6	126.4	155.4	175.9	198.7	223.8	248.9	273.1	298.5	319.2
Amortization	103.1	84.6	71.4	51.2	25.8	38.1	-	-	-	-
Adjustments from Operating Activities:										
Accounts receivable, net	(152.4)	(177.5)	(188.8)	(190.5)	(210.4)	(214.0)	(208.1)	(214.7)	(184.8)	(182.0)
Inventories	(12.5)	(50.7)	(58.3)	(55.9)	(60.4)	(56.3)	(62.0)	(61.3)	(52.0)	(47.7)
Prepaid and other current assets	(91.3)	(106.4)	(113.2)	(114.2)	(126.1)	(128.3)	(124.7)	(128.7)	(110.8)	(109.1)
Operating lease right-of-use assets, net	(91.6)	(106.6)	(113.4)	(114.5)	(126.4)	(128.6)	(125.0)	(129.0)	(111.0)	(109.3)
Deferred income taxes	(82.1)	(89.9)	(98.5)	(107.9)	(118.2)	(129.5)	(141.8)	(155.4)	(170.2)	(186.4)
Other long-term assets	(75.8)	(88.3)	(93.9)	(94.8)	(104.6)	(106.5)	(103.5)	(106.8)	(91.9)	(90.5)
Accounts payable and accrued liabilities	180.9	210.7	224.1	226.1	249.7	254.0	246.9	254.8	219.3	215.9
Operating lease liabilities, current	(19.1)	10.8	11.4	11.5	12.7	13.0	12.6	13.0	11.2	11.0
Deferred revenue	285.9	332.9	354.2	357.4	394.6	401.4	390.2	402.6	346.6	341.3
Long-term operating lease liabilities	(107.5)	76.9	81.9	82.6	91.2	92.8	90.2	93.1	80.1	78.9
Long-term deferred revenue	28.2	32.8	34.9	35.2	38.9	39.6	38.5	39.7	34.2	33.7
Other long-term liabilities	62.2	72.4	77.0	77.7	85.8	87.3	84.8	87.5	75.4	74.2
Net cash from operating activities	1,534.0	2,050.1	2,420.3	2,808.4	3,270.3	3,727.0	4,160.5	4,654.6	5,068.2	5,525.7
CASH FLOWS FROM INVESTING ACTIVITIES										
Short-term investments	(6.3)	(6.6)	(6.8)	(7.1)	(7.4)	(7.7)	(8.0)	(8.4)	(8.7)	(9.1)
Property and equipment, gross	(89.7)	(243.1)	(237.6)	(267.6)	(299.7)	(324.6)	(346.2)	(375.2)	(381.8)	(405.6)
Redeemable non-controlling interest	-	-	-	-	-	-	-	-	-	-
Goodwill	(182.5)	-	-	-	-	-	-	-	-	-
Non-controlling interest	-	-	-	-	-	-	-	-	-	-
Net cash from investing activities	86.5	(249.6)	(244.4)	(274.7)	(307.1)	(332.3)	(354.3)	(383.6)	(390.5)	(414.6)
CASH FLOWS FROM FINANCING ACTIVITIES										
Long-term debt	2.6	1.5	1.6	1.7	1.9	1.9	2.0	2.1	1.8	1.9
Treasury stock	1,510.9	-	-	164.8	-	-	-	-	-	-
Common stock	-	-	-	-	-	-	-	-	-	-
Capital in excess of par value	51.8	51.8	34.7	-	-	-	-	-	-	-
Accumulated other comprehensive income (loss)	-	-	-	-	-	-	-	-	-	-
Net cash from financing activities	1,565.3	53.3	36.3	166.4	1.9	1.9	2.0	2.1	1.8	1.9
Cash and cash equivalents at the end of period	4,624.7	6,478.6	8,690.7	11,390.9	14,356.0	17,752.6	21,560.8	25,833.8	30,513.3	35,626.3

Synopsys, Inc.
Value Driver Estimation
\$ in millions

Fiscal Years Ending Oct. 31	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E
NOPLAT:													
EBITA:													
Total revenue	4,204.2	5,081.5	5,842.6	6,783.0	7,878.3	9,043.4	10,219.0	11,517.0	12,837.7	14,121.4	15,446.0	16,586.3	17,709.0
(-) Cost of revenue	980.9	1,171.4	1,367.3	1,536.0	1,727.2	1,976.6	2,215.1	2,476.7	2,768.9	3,021.9	3,306.3	3,555.6	3,796.8
(-) Research and development	1,504.8	1,680.4	1,946.8	2,260.2	2,585.7	2,922.9	3,251.8	3,607.2	3,956.7	4,281.8	4,606.2	4,863.3	5,103.9
(-) Sales and marketing	712.5	779.8	889.0	1,032.1	1,159.4	1,285.6	1,401.7	1,522.1	1,664.5	1,795.7	1,925.5	2,026.2	2,119.1
(-) General and administrative	203.9	246.1	265.2	297.7	334.0	369.8	402.6	436.4	467.2	492.7	515.8	529.0	538.2
(-) Amortization of intangible assets	33.9	29.8	28.0	37.7	30.9	26.1	18.7	9.4	13.9	-	-	-	-
(+) Implied interest on operating leases	23.7	26.8	27.3	31.7	36.8	42.3	47.8	53.8	60.0	66.0	72.2	77.5	82.8
EBITA	791.9	1,200.9	1,373.5	1,651.0	2,077.9	2,504.6	2,977.0	3,519.0	4,026.4	4,595.3	5,164.5	5,689.8	6,233.8
Marginal tax rate	7.1%	7.1%	7.1%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%
Total adjusted taxes:													
Income tax expense	49.2	137.1	83.7	260.5	328.0	395.5	470.2	556.0	636.2	726.4	816.5	899.7	986.0
(+) Tax shield on interest expense	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
(-) Tax on interest or investment income	0.2	0.6	2.6	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.3
(-) Tax on other income (expense), net	4.6	(4.0)	(0.4)	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.8
(+) Tax on implied interest on operating asset	1.7	1.9	1.9	5.1	5.9	6.8	7.6	8.6	9.6	10.6	11.5	12.4	13.2
Total adjusted taxes	44.6	140.6	81.5	264.2	332.5	400.7	476.3	563.0	644.2	735.2	826.3	910.4	997.4
Change in deferred taxes	(128.6)	(36.9)	(211.0)	(82.1)	(89.9)	(98.5)	(107.9)	(118.2)	(129.5)	(141.8)	(155.4)	(170.2)	(186.4)
NOPLAT	618.7	1,023.3	1,081.0	1,304.7	1,655.5	2,005.3	2,392.7	2,837.7	3,252.7	3,718.2	4,182.8	4,609.2	5,049.9
Invested Capital (IC):													
Operating working capital:													
Normal cash	911.5	1,101.7	1,266.7	1,470.6	1,708.0	1,960.6	2,215.5	2,496.9	2,783.2	3,061.5	3,348.7	3,595.9	3,839.3
(+) Accounts receivable	568.5	796.1	947.0	1,099.4	1,276.9	1,465.8	1,656.3	1,866.7	2,080.7	2,288.8	2,503.5	2,688.3	2,870.3
(+) Inventories	229.0	211.9	325.6	338.1	388.8	447.1	503.0	563.3	619.7	681.6	743.0	795.0	842.7
(+) Prepaid and other current assets	430.0	439.1	567.5	658.9	765.2	878.4	992.6	1,118.7	1,247.0	1,371.7	1,500.3	1,611.1	1,720.1
Operating current assets	2,139.0	2,548.8	3,106.7	3,566.9	4,138.9	4,751.9	5,367.4	6,045.6	6,730.6	7,403.6	8,095.5	8,690.3	9,272.4
Accounts payable and accrued liabilities	741.2	809.4	1,123.8	1,304.6	1,515.3	1,739.4	1,965.5	2,215.2	2,469.2	2,716.1	2,970.9	3,190.2	3,406.1
(+) Deferred revenue	1,517.6	1,910.8	1,776.0	2,061.9	2,394.8	2,749.0	3,106.3	3,500.9	3,902.3	4,292.5	4,695.2	5,041.8	5,383.1
Non-interest bearing operating current liabilities	2,258.8	2,720.2	2,899.8	3,366.5	3,910.1	4,488.4	5,071.8	5,716.1	6,371.5	7,008.6	7,666.1	8,232.0	8,789.2
Net operating working capital	(119.8)	(171.4)	207.0	200.4	228.8	263.5	295.5	329.5	359.1	395.0	429.4	458.3	483.2
Property and equipment, net	472.4	483.3	557.3	508.4	625.0	707.1	798.8	899.8	1,000.7	1,098.0	1,200.1	1,283.5	1,369.9
Net other operating assets:													
Operating lease right-of-use assets, net	493.3	559.1	568.8	660.4	767.0	880.5	994.9	1,121.3	1,249.9	1,374.8	1,503.8	1,614.8	1,724.1
(+) Intangible assets	279.1	386.4	374.2	271.1	186.5	115.1	63.9	38.1	-	-	-	-	-
(+) Other	510.7	463.7	471.0	546.8	635.1	729.0	823.8	928.4	1,034.8	1,138.3	1,245.1	1,337.0	1,427.5
Net other operating assets	1,283.1	1,409.2	1,414.0	817.9	821.6	844.1	887.6	966.5	1,034.8	1,138.3	1,245.1	1,337.0	1,427.5
Other operating liabilities:													
Deferred revenue	136.3	154.5	175.1	203.3	236.1	271.1	306.3	345.2	384.8	423.3	463.0	497.2	530.8
Other operating liabilities	136.3	154.5	175.1	203.3	236.1	271.1	306.3	345.2	384.8	423.3	463.0	497.2	530.8
Invested capital	1,499.4	1,566.6	2,003.1	1,323.3	1,439.3	1,543.6	1,675.7	1,850.6	2,009.8	2,208.0	2,411.7	2,581.6	2,749.8
Free Cash Flow (FCF):													
NOPLAT	618.7	1,023.3	1,081.0	1,304.7	1,655.5	2,005.3	2,392.7	2,837.7	3,252.7	3,718.2	4,182.8	4,609.2	5,049.9
(-) Change in invested capital	(86.8)	67.3	436.5	(679.8)	116.0	104.4	132.0	174.9	159.2	198.3	203.7	170.0	168.1
FCF	705.5	956.1	644.5	1,984.6	1,539.5	1,901.0	2,260.7	2,662.8	3,093.5	3,519.9	3,979.1	4,439.3	4,881.8
Return on Invested Capital (ROIC):													
NOPLAT	618.7	1,023.3	1,081.0	1,304.7	1,655.5	2,005.3	2,392.7	2,837.7	3,252.7	3,718.2	4,182.8	4,609.2	5,049.9
(/) Beginning IC	1,586.20	1,499.38	1,566.65	2,003.11	1,323.28	1,439.25	1,543.63	1,675.68	1,850.60	2,009.76	2,208.03	2,411.68	2,581.64
ROIC	39.0%	68.3%	69.0%	65.1%	125.1%	139.3%	155.0%	169.3%	175.8%	185.0%	189.4%	191.1%	195.6%
Economic Profit (EP):													
Beginning IC	1,586.2	1,499.4	1,566.6	2,003.1	1,323.3	1,439.3	1,543.6	1,675.7	1,850.6	2,009.8	2,208.0	2,411.7	2,581.6
x (ROIC - WACC)	29.9%	59.2%	59.9%	56.1%	116.0%	130.3%	145.9%	160.3%	166.7%	175.9%	180.4%	182.1%	186.5%
EP	474.8	887.4	938.9	1,123.1	1,535.5	1,874.8	2,252.7	2,685.7	3,084.8	3,535.9	3,982.5	4,390.5	4,815.8

Synopsys, Inc.*Weighted Average Cost of Capital (WACC) Estimation*

Cost of Equity:			ASSUMPTIONS:	
Risk-Free Rate	3.70%		10Y Treasury bond (as of 9/9/24)	
Beta	1.08			
Equity Risk Premium	5.00%		Henry Fund consensus estimate	
Cost of Equity	9.10%			
Cost of Debt:				
Risk-Free Rate	3.70%		10Y Treasury bond (as of 9/9/24)	
Implied Default Premium	1.10%			
Pre-Tax Cost of Debt	4.80%		Per Bloomberg terminal (no publically traded debt)	
Marginal Tax Rate	16%			
After-Tax Cost of Debt	4.03%			
Market Value of Common Equity:			MV Weights	
Total Shares Outstanding	153.61			
Current Stock Price	\$506.65			
MV of Equity	77,826.51		99.37%	
Market Value of Debt:				
Short-Term Debt	0			
Current Portion of LTD				
Long-Term Debt	20.65			
PV of Operating Leases	476.54			
MV of Total Debt	497.19		0.63%	
Market Value of the Firm	78,323.70		100.00%	
Estimated WACC			9.0698%	

Synopsys, Inc.
Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models
Key Inputs:

CV Growth of NOPLAT	4.00%
CV Year ROIC	195.6%
WACC	9.07%
Cost of Equity	9.10%
CV of NOPLAT	5,049.9

Fiscal Years Ending Oct. 31	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E
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DCF Model:

Free Cash Flow (FCF)	1,984.6	1,539.5	1,901.0	2,260.7	2,662.8	3,093.5	3,519.9	3,979.1	4,439.3	4,881.8
Continuing Value (CV)										97,571.2
PV of FCF	1,819.5	1,294.1	1,465.1	1,597.4	1,725.1	1,837.5	1,916.9	1,986.8	2,032.2	44,666.3

Value of Operating Assets:	60,341.1
Non-Operating Adjustments	
(+) Excess cash	172.2
(+) Short-term investments	151.6
(+) Redeemable non-controlling interest	31.0
(-) Non-controlling interest	(6.0)
(-) Long-term debt	(18.1)
(-) PV of operating leases	(66.6)
(-) ESOP	(323.1)
Value of Equity	60,282.3
Shares Outstanding	153.6
Intrinsic Value of Last FYE	\$ 392.44
Implied Price as of Today	\$ 418.09

EP Model:

Economic Profit (EP)	1,123.1	1,535.5	1,874.8	2,252.7	2,685.7	3,084.8	3,535.9	3,982.5	4,390.5	4,815.8
Continuing Value (CV)										94,989.6
PV of EP	1,029.7	1,290.7	1,444.9	1,591.8	1,740.0	1,832.3	1,925.6	1,988.5	2,009.9	43,484.5

Total PV of EP	58,337.9
Invested Capital (last FYE)	2,003.1
Value of Operating Assets:	60,341.1
Non-Operating Adjustments	
(+) Excess cash	172.2
(+) Short-term investments	151.6
(+) Redeemable non-controlling interest	31.0
(-) Non-controlling interest	(6.0)
(-) Long-term debt	(18.1)
(-) PV of operating leases	(66.6)
(-) ESOP	(323.1)
Value of Equity	60,282.3
Shares Outstanding	153.6
Intrinsic Value of Last FYE	\$ 392.44
Implied Price as of Today	\$ 418.09

Effects of ESOP Exercise and Share Repurchases on Common Stock Account and Number of Shares Outstanding

Current Average Strike Price:	\$ 142.41
Cost of Equity:	9.10%
Current Stock Price:	\$506.65

[illegible]

Synopsys, Inc.*Valuation of Options Granted under ESOP*

Current Stock Price	\$460.93
Risk Free Rate	3.70%
Current Dividend Yield	0.00%
Annualized St. Dev. of Stock Returns	33.46% << Per Bloomberg (9/12/24)

Range of Outstanding Options	Number of Shares	Average Exercise Price	Average Remaining Life (yrs)	B-S Option Price	Value of Options Granted
Range 1	0.97	142.41	2.67	\$ 332.36	\$ 323
Total	0.97	\$ 142.41	2.67	\$ 332.36	\$ 323