

Krause Fund Research, April 15, 2023
 Spring 2023
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Stock Rating

SELL

Nvidia (NASDAQ: NVDA)



Investment Thesis

We recommend a SELL rating as Nvidia currently trades at a 28.5% - 37.0% premium to our valuation estimate. While Nvidia has strong growth potential, we believe this expansion is overly estimated in its current market valuation.

Drivers of Thesis:

- Nvidia's stock price has already risen 126% in the past six months, making the company incredibly overvalued relative to peers throughout the industry.
- Nvidia operates in a highly specialized and capital-intensive industry and is unlikely to expand outside its current sub-industry.
- Enterprise and consumer spending is likely to ease over the next 6-18 months as economies around the world continue to fight inflation, hurting short-term growth prospects.

Risks of Thesis:

- An explosion in demand for chips via AI computing could have an outsized benefit for Nvidia and propel the stock to continue to trade at a premium multiple.
- Policy changes that hinder competition from China could benefit Nvidia.
- Greater than expected growth in the gaming industry would benefit Nvidia more than peers.

Current Price: \$270 Target Price: \$169 - \$183

Company Description:

Nvidia Corp. engages in the design and development of graphics processing units, system-on-a-chip units for gaming, professional visualization, data center, and automotive markets.

Snapshot

Valuation Models

DCF: \$182.67
 Relative Valuation: \$113.77
 DDM: \$88.73

Price Data

Current Price: \$267.58
 52 Week Range: \$108.13 - \$280.00
 Current P/E: 153.78

Key Statistics

Market Capitalization: 661B
 Shares Outstanding: 2.46M
 2022 EPS: \$3.91
 2023E EPS: \$3.69
 Beta: 1.88
 WACC: %12.57

Financial Profile

2022 Revenue: \$26,914
 2023E Revenue: \$33,090
 2022 Net Income: \$9,752
 2023E Net Income: \$9,256
 2022 Gross Margin: \$17,475
 2023E Gross Margin: \$21,816

Earnings Estimates

Year	2023E	2024E	2025E
EPS	\$3.69	\$5.90	\$8.80
Growth	-6%	37%	33%

3-Year Stock Performance vs the S&P

Investopedia published on TradingView.com, February 15, 2023 18:12:19 MST
 BATS:NVDA, 1D 597.05 A +13.90 (+0.66%) Cr500.98 R=407.08 L2503.87 C2597.14



Source: Investopedia¹⁷

Executive Summary

Nvidia Corporation (NASDAQ: NVDA), is a multinational semiconductor design and development company headquartered in Santa Clara, California. Nvidia supplies graphic and memory semiconductor chips to businesses and consumers around the world. Nvidia's designed chips are manufactured primarily in China and Taiwan before being sold to OEMs and ODMs. An OEM, or original manufacturer is defined as a company whose goods are used as components of another company. ODM companies, or original design manufacturers, are similar to contract electronic manufacturers. Both companies make up the bulk of Nvidia's products sales overall.

Nvidia seeks to continually develop the most efficient and powerful semiconductors on the market. Innovation is the company's core goal, investing over \$37 billion in research and development since the business's inception in 1993.⁸

Economic Analysis

Economic Outlook: **NEUTRAL**

We forecast dampened growth in the U.S economy for 2023, with a near zero to negative growth in the second half of the year. This is driven by tighter monetary policy enacted to fight inflation paired with recent turmoil in the financial sector. However, the job market remains in strong shape and consumer spending has remained resilient. Given these factors, we forecast the U.S economy to hold up well against the current headwinds it faces, before returning to more normalized growth in 2024.

GDP Growth

Over the last year, interest rates have continued to rise to combat the recent aggressive rise in inflation. We believe that the federal reserve will begin to cut the benchmark federal funds rate within the next 6 - 12 months, which will result in an overall rebound for the economy. As the cost of borrowing decreases, demand for goods and services will rise, but at a slower rate than in previous periods. We forecast the cumulative tightening effects of recent monetary policy to blunt nearly any economic growth in 2023, before a return to more normalized growth in the following years.

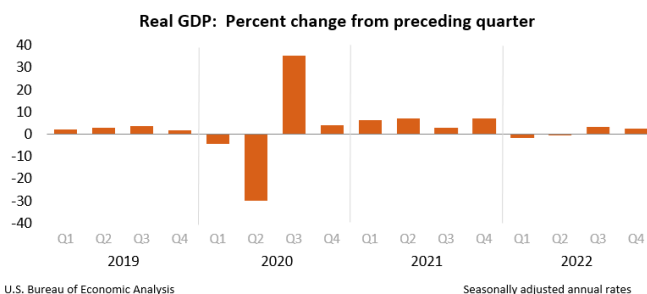
GDP growth projected by the federal reserve is forecasting negative growth for the remainder of the year. The federal reserve forecasts 0.4% real GDP growth in 2023 (after a

positive 2.6% growth in Q1, which means negative growth for the remainder of the year).¹⁴

This is the result in a pullback in consumer and enterprise spending as consumers and businesses brace for a potential economic contraction and deal with high levels of inflation.

We believe that the cumulative tightening effects of the federal reserve's rate hikes and a credit pullback arising from the recent turmoil among regional banks will lead to tighter credit and lower growth.

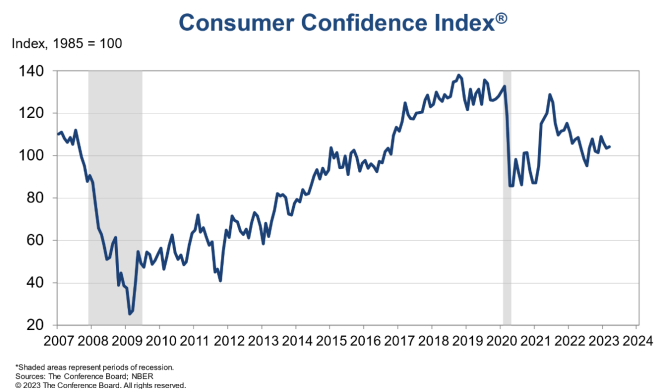
We forecast that GDP growth for the fiscal year 2023 will be between 0.20 - 0.50%, before returning to normalized growth of 2.50% in 2024 as inflation and monetary tightening ease. This lack of growth will be reflected less so in semiconductor manufacturers like Nvidia's financials, as they produce essential components to technology products.



Source: *Bureau of Economic Analysis*¹

Consumer Confidence Index

While the consumer confidence index, measured by the conference board, increased to 104.2 in March from 103.4 in February, it has still fallen considerably from its readings in the year leading up to the pandemic.²



Source: *TheConferenceBoard*²

The drop in consumer confidence is likely to hinder demand for any business with a consumer-facing component. We forecast a recovery in consumer confidence driven by rate cuts and

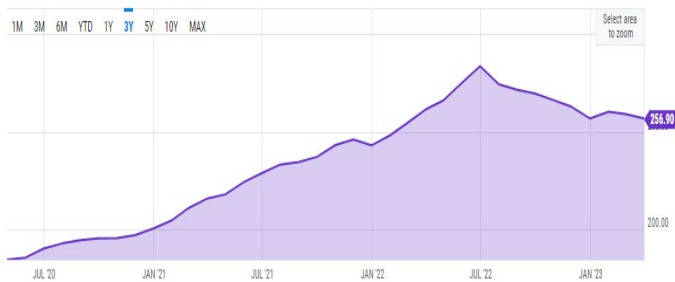
renewed confidence in the financial system in Q4 of 2023. In the short-term however, with consumer confidence still considerably lower than previous years, we expect that Nvidia will struggle to sell semiconductors at an increased price due. This is due to the uncertainty throughout the economy, as well as uncertainty as to what the consumer feels is best in the economy.

Producer Price Index

PPI tracks input inflation for goods-producing businesses. Nvidia is greatly affected by moves in the price for cobalt, copper, and silicon as these materials are used in the construction of semiconductors. As the economy continues to fight inflation, there has been a drastic increase in price for these items. Shown below, PPI has been on the rise since the COVID-19 pandemic, which is leading to more expensive products overall. Silicon, which is the most common metal when producing semiconductors, has seen a 400% increase in price since the beginning on 2020¹⁹.

The PPI by all commodities has decreased from highs in June 2022 of 280 to 257 today.

PPI by All Commodities (I: USPPIC)



Source: *FRED*³

We forecast that the high PPI index will have a negative effect on Nvidia's margins. As previously expressed above, the main metal in producing these semiconductors, silicon, has increased over 400%. With the current inflation numbers reaching record highs, we could see Nvidia struggle to meet past margins and projected profits over the next couple of years.

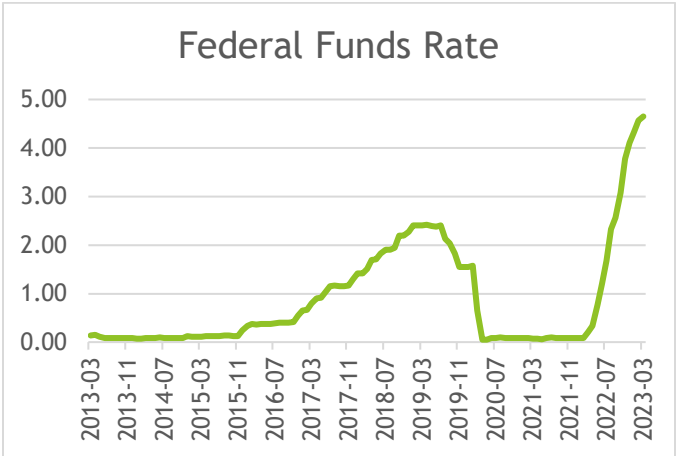
Interest Rates

The federal reserve has moved aggressively in the past 12 months to raise its benchmark federal funds rate to fight high inflation. The federal funds rate currently sits at a range of 4.75% to 5.00%, well above its near-zero position in early 2022.

The increase in the cost of capital will make it more difficult for businesses to access cheap financing, and floating-rate borrowings will negatively impact earnings. This will likely affect corporate strategy and consumer spending on things such as automobiles and electronics that Nvidia's chips are used in.

We forecast that the federal reserve will halt its rate hikes, before cutting in late 2023 to early 2024 in response to weakening economic conditions. We forecast the federal funds rate to have a target range of 3.75% to 4.0% in 12 months.

Regardless of how soon rate hikes begin to fall, the increase of the cost of capital will have a detrimental impact on Nvidia as a whole. With the extreme growth that Nvidia has seen over the past year, they have begun to reinvest those earnings with purchases of capital expenditures and PP&E. With much higher interest rates than in the previous years, it makes it much harder to continue to support the high growth phase that is being experienced.



Source: *FRED*⁴

Unemployment Rate

The United States is currently enjoying half-a-century-low unemployment rate of 3.50% driven by the post covid hiring boom and a lower labor force participation rate.

Industry Analysis

The semiconductor industry includes businesses involved in the design, production, and sale of electronic components known as semiconductors. Semiconductors are used in many products, including smartphones, personal computers, automobiles, and more. There are many different types of semiconductor chips, each with a different niche utility. In an industry known for its rapid technological innovation to make faster, smaller, and more efficient chips, firms tend to specialize in one or two types of semiconductors to attempt to be a market leader in that specialized space.

Industry Outlook: POSITIVE

As technology continues to advance, consumers and businesses will demand the most efficient and technologically advanced products and services. This means that increased computing power will be needed, leading to increased demand for semiconductor chips. While geopolitical and supply chain risks are present, the industry is poised to continue to enjoy robust growth in an increasingly technological world.

Overview

A semiconductor goes from being designed, to then being manufactured in-house, or, outsourced to a foundry such as TSMC, to then being sold to a PC, smartphone, automobile, etc., manufacturer.

The types of semiconductors produced include:

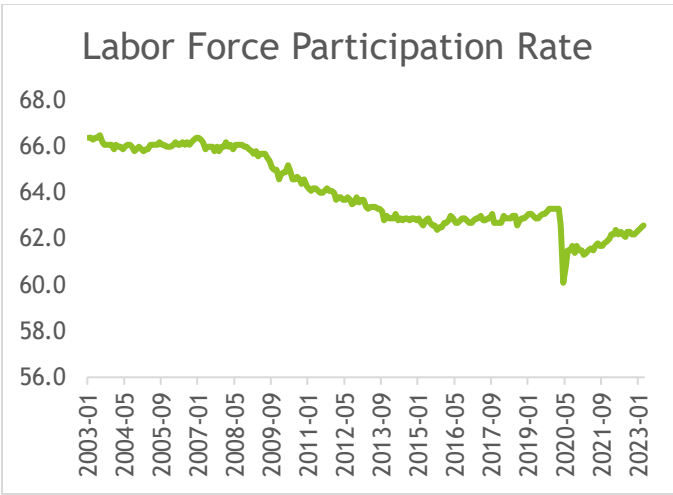
Memory Chips: Memory chips are commonly found in computers and data storage to store data and programs.

Microprocessors: Microprocessors are found in computer servers, personal computers, tablets, and smartphones. Microprocessors contain one or many central processing units (CPUs).

Graphic Processing Units: Also known as GPUs, graphic processing units are a type of microprocessor built to render graphics for display on a device. GPUs are typically used in tandem with a CPU which increases the device's performance and allows for more advanced software activities such as artificial intelligence or machine learning.

Commodity ICs: Commodity integrated circuits are more basic chips used to perform simple, repetitive routines. Commodity ICs are often found in single-purpose appliances and have very low margins.

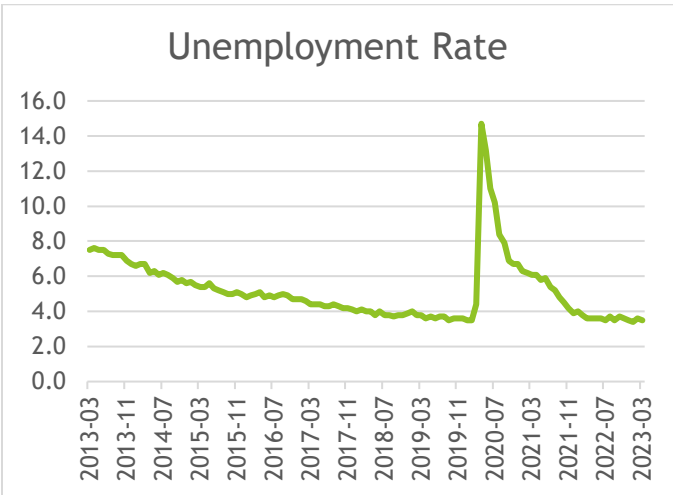
Analog Chips: Analog chips have mostly been replaced by digital chips but are still seen in sensors.



Source: FRED⁵

Cracks in the labor market have begun to emerge as large layoffs have been announced and non-farm payroll growth has slowed in recent months. Employers added 236,000 workers in March, the lowest number in almost two years.⁶

While we see continued weakness in the United States economy through 2023, the labor market remains strong, and we forecast unemployment to rise to a still low of 3.90% - 4.10% over the next 12 months. While this might alleviate wage pressures, Nvidia's need to hire highly skilled workers to produce its high-tech chips will likely grow. This would have a negative impact on Nvidia, as there may not be enough highly skilled workers in the workforce. Ultimately, as unemployment continues to rise in the next 12 months, Nvidia itself could be faced with layoffs if they feel that worker productivity and skill is down.







Source: FRED⁷

Industry Trends

Increased Chip Content in Products

One of the main trends within the semiconductor industry over the past few years has been increased semiconductor content in devices and products. As technology aims to be more advanced and powerful, there are more chips needed in every smartphone, PC, and automobiles to drive that computing power. As such technological innovation continues, chipmakers will benefit from increased demand per unit, driving overall demand.

SEMICONDUCTOR CONTENT OUTLOOK FOR SELECT END-MARKETS

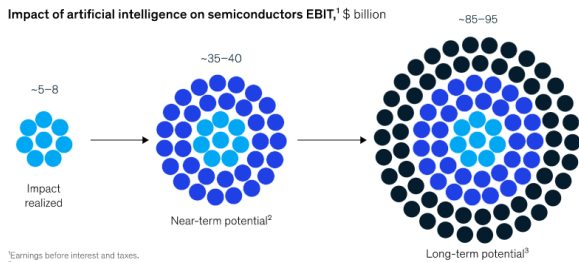
Semi Content Per Unit	2015	2020	2025e
 High End Smartphone	\$100	\$170	\$275
 Auto (Global Average)	\$310	\$460	\$690
 Datacenter Server (CPU + Accelerator)	\$1,620	\$2,810	\$5,600
 Smart Home (Global Average)	\$2	\$4	\$9

Source: *CFRA*¹¹

Rise of Artificial Intelligence

One technology that has put the world on notice is artificial intelligence and machine learning. These technologies have the ability to help increase productivity, automate tasks, and handle data more efficiently. There is now a battle for which chipmaker will be the top choice of AI technologies, with Nvidia currently leading the pack. In the coming years we forecast that AI/machine learning will help drive demand for chips.

Artificial intelligence could generate \$85 billion to \$95 billion for semiconductor companies over the long term.



¹Earnings before interest and taxes.
²Near-term potential refers to gains within the next 2-3 years.
³Long-term potential refers to gains achieved 4 years or more in the future.

McKinsey & Company

Source: McKinsey¹⁶

Porter's Five Forces

Threat of Substitute Products: LOW

The threat of substitute products is low as firms in the semiconductor space have specialized in a certain chip type or two and are unlikely to look to expand into others due to the high capital and technical expertise needed to do so. Additionally, everything from smartphones to automobiles need semiconductor chips, and there is no current alternative.

Threat of New Entrants: LOW

The threat of new entrants into the market is low. The semiconductor industry is dominated by large, entrenched firms that possess the capital and engineering capabilities to produce high-tech and innovative chips. It is much more likely any industry disruption would come from an innovative product being developed by a current market leader.

A startup in the semiconductor space is rare, as the capital needed to support a company of that caliber is difficult to obtain. With only a handful of companies controlling this space, the consumer would have an incredibly difficult time justifying a new product from a new company.

Bargaining Power of Suppliers: HIGH

The bargaining power of suppliers is high, as the precious metals needed in the creation of semiconductors cannot be substituted. This gives companies who source metals like silicon and copper high power to determine the price and quantity that is being sold to companies like Nvidia.

As prices of these resources continue to rise, the supplier has full control over the market, which could further decrease Nvidia's margins and production level. Many larger companies, such as Nvidia, have been reliant on single suppliers since the inception of the company.

Bargaining Power of Customers: HIGH

Bargaining power of customers, such as automobile or technology hardware manufacturers, is high as buyers typically buy in large volumes, giving them ample negotiating power. As such, the desires of OEMs and ODMs typically are listened to by chipmakers and designers.

Such high-volume purchases provide customers with a stronger position in negotiations, enabling them to demand favorable terms and conditions from suppliers. This puts Nvidia's at risk to be forced to lower their prices, provide better quality, or offer additional graphics and compute and networking products or

services. This could lower margins by forcing Nvidia to spend more on R&D or lower unit sale prices.

Industry Rivals: HIGH

There is high intensity of competition in the semiconductor industry, but each type of semiconductor chip may have only a few big players. The constant need for innovation is driven by customers constantly wanting the best and most efficient chips.

This rise of AI had created a massive demand for powerful computing and software. While Nvidia has established itself as a leading player in this market, this increasing popularity will increase the number of rivals in the space. Companies, like Google, are already claiming they have developed faster chips. As a result of this increase of competition, Nvidia will need to continually innovate and improve its products to maintain its position as an industry leader. Failure to do so could result in the loss of market share to competitors, which could have significant financial implications for the company.

Comparison to Peers

Nvidia is a fabless semiconductor chip design and development company. Nvidia designs chips, and outsources the manufacturing of those chips to foundries, before taking that produced chip and selling it to original equipment manufacturers and original design manufacturers.

Nvidia specializes in graphic and memory chip spaces, commonly found in PCs, automobiles, artificial intelligence, and data centers. Nvidia’s biggest competitors in this space are AMD, Qualcomm, and Broadcom.

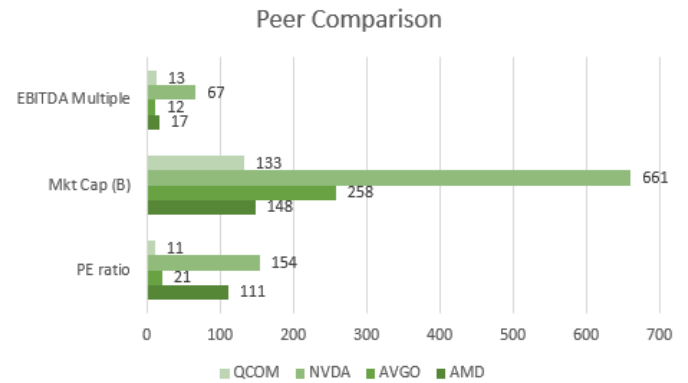
Nvidia is the largest player in the fabless space, with a market cap \$654.4 billion. Broadcom and AMD are the next two largest, with market capitalizations of \$257.1 and \$148.8 billion respectively.

Nvidia and Broadcom are the most operationally efficient of the peer group, with 5-year average net margins of roughly 27%, compared to 12% - 18%. However, Broadcom has not grown at the same rate as Nvidia and AMD.

Broadcom’s 5-year sales CAGR is 13.5%, while Nvidia and AMD boast a 5-year sales CAGR of 22.7% and 34.7%.

While there is strong competition in the fabless space, we believe that Nvidia is the market leader due to its strong relative positioning in both growth and profitability. Additionally, Nvidia’s partnership with Open AI and strong presence in the growing gaming space set the firm up well for industry-leading future performance. However, Nvidia’s current premium valuation versus its peers is evidence that this is already priced

in, and the price that is reflected in the markets could begin to taper off as competitors introduce new products and research of their own.



Source: *Factset*⁸

Nvidia is currently trading at a P/E of 152x, making it a relatively unattractive investment.

These four businesses all have sales figures between \$16-\$36 million, and the firm that can continue to innovate and adapt its chips to the technology demands of the future will be able to gain market share.

While we believe Nvidia is in the best position to gain market share and perform well in the future, the strong competition and current valuation prevent it from being a desirable investment.⁸

Company Analysis

Company Outlook: POSITIVE

Nvidia’s ability to continually innovate its semiconductor chip products in both the graphics and computing space have helped it become an industry leader. Its strong financial position allows it to continually invest in research and development to outpace competitors. As such, Nvidia is in prime position to benefit from the industry wide tailwinds driving growth including the rise of AI technology and increased semiconductor content needed in electronics.

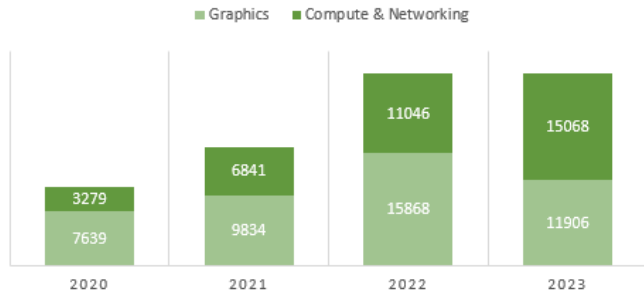
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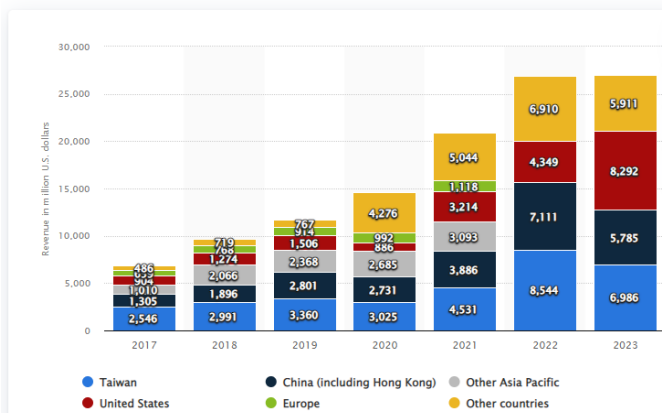
Nvidia generates revenue from the sale of its graphic processing units and compute and networking chips.

NVDA REVENUE WORLDWIDE BY SEGMENT



Source: Statista⁹

Nvidia revenue worldwide from 2017 to 2023, by region (in million U.S. dollars)



Source: Statista¹⁰

Graphics Segment

Nvidia’s graphics segment, chips used to render high-quality graphics and improve overall computing efficiency, includes the GeForce GPUs for gaming and PCs, the GeForce Now game streaming service, and related infrastructure. It also includes the NVIDIA RTX GPU for enterprise workstation graphics and virtual GPUs software for cloud-based visual and virtual computing, and automotive platforms for infotainment.

The graphics segment has experienced strong growth in recent years, nearly doubling from \$7.64 billion in 2020 to \$15.88 billion in 2022.⁸

The graphics unit is driven by the demand of automobile manufacturers, PC manufacturers, Artificial intelligence developers, and the gaming industry. Pent-up savings from the COVID-19 pandemic pushed demand for new cars and consumer technology devices, benefiting this segment.

The increased demand by automobile manufacturers, especially for electric vehicles, as well as the growing gaming industry and artificial intelligence space which has been responsible for recent growth will drive high growth for this segment in the future.

As such, we forecast that graphics revenue growth outpaces the compute and networking segment, as seen in recent years, growing at 25%, 55%, and 45% in 2023, 2024, and 2025. These high growth figures are supported by increased semiconductor content, or dollar amount needed, in new, high-tech products. Nvidia currently has contracts with OpenAI, the creator of ChatGPT to supply the machine learning program with chips to power its AI models.

Compute & Networking Segment

Nvidia’s compute and network segment is comprised of the Data Center accelerated computing platform, NVIDIA AI Enterprise, and other software and cryptocurrency mining processors.

The Data Center platform combines Nvidia’s GPUs with data processing units (DPUs) to help accelerate and make AI, cloud, and data analytics workloads more efficient.

Data Centers are needed by businesses that are unable to store the mass amounts of data they collect on personal computer networks. Enterprise spending by large technology and communications businesses drives the demand for this segment.

The compute and networking segment has seen revenues grow from \$3.28 billion in 2020 to \$15.07 billion in 2023.⁸

We believe that the growth in AI technology will benefit the compute and networking segment, as its DPUs are paired with graphic processors to enhance computing power. Continued demand from cloud service providers in an increasingly technological world will help propel this segment as well.



Source: *Precedence Research*¹³

We forecast revenue growth for the compute and networking segment of 20% in 2023, 45% in 2024, and 40% in 2025. This is influenced by slower demand in a weakening global economic climate in 2023, before more normalized conditions in 2024 and 2025.

Swot Analysis

Strengths

Nvidia's greatest strength has been its ability to innovate and continually design some of the most efficient and powerful chips on the market. This has allowed Nvidia to become the chip provider for OpenAI's ChatGPT machine learning tool, which has taken the world by storm. Nvidia has grown its customer base and thus revenues by being at the cutting edge of the semiconductor industry. High spending in research and development has paid off as the business has been able to thrive in an intense, competitive space.

Nvidia's position as a fabless player in the semiconductor space lends itself well to continuing as an innovator. By not being involved in the manufacturing of the semiconductors themselves, Nvidia frees up material capital to be spent on research and development. This also allows management and employees to focus wholly on designing the best chips possible and getting them to customers. In a competitive and cyclical industry, being best in class is better than being mediocre in every class.

Nvidia also benefits from not being overly concentrated to a single customer, making the business less risky. No customer represented 10% or more of total revenue for fiscal years 2023 and 2022.¹⁴

Weaknesses

Nvidia has an absence of a top selling device. Tegra mobile chips, manufactured by Nvidia, have not been incorporated into

bestselling devices like the iPhone. For tablets, they power Android-based devices which have not gained traction.

Nvidia is facing high bargaining power from the channel partners in the semiconductor industry. The firm has been unsuccessful in streamlining operations to reduce bargaining power, resulting in a higher dependence on the channel partners. Some channel partners include Gigabyte, Micro Star International, ASUS, and ASRock who package chips in the form of usable GPUs and distribute them globally.

Opportunities

As automobiles get more technologically advanced, they require more semiconductor content per vehicle. To power the infotainment screens seen in the front-center consoles of cars, OEMs purchase Nvidia's GPUs. As automobile companies continue to compete and try to outdo one another, Nvidia is in a prime position to benefit from the increased demand per vehicle for its products.

AI technology and its application and integration into our daily lives are just getting started. To power these compute-intensive technologies, an army of chips is needed. Nvidia already has contracts with OpenAI, one of the leaders in the machine learning space, and its culture of innovation sets up the business well to benefit from the growth in AI.

Threats

Nvidia is heavily reliant on China and Taiwan to drive its revenues with 47% coming from just these two countries. Given the geopolitical tension and recent escalation, any conflict between these two nations could lead to severely dampened demand for Nvidia's chips.¹⁰

Given the cyclical nature of the business, if Nvidia is not able to accurately prepare for consumer demand in the future, it could lead to not being able to fulfill customer orders. Moreover, this could damage Nvidia's relationships with its concentrated customer base, hurting revenues materially.

Another threat that Nvidia is facing is the growing prices of essential materials used. These resources are finite, meaning that the prices can easily fluctuate on a day-to-day basis. This poses a threat to Nvidia as higher prices from the supplier can result in more expensive production costs overall.

Valuation Analysis

Valuation Outlook: **NEGATIVE**

While we remain positive about the semiconductor industry and Nvidia's business going forward, Nvidia does not trade at an attractive price relative to its intrinsic value. We forecast strong revenue and earnings growth; however, the market seems to be far more optimistic in their growth assumptions overall. We believe that Nvidia should trade closer to its peers, and that this will occur as the high growth phase that we have seen in recent years.

Methods

To value Nvidia, we analyzed the company's recent performance and trends, as well as the underlying economic and industry conditions. Pairing that with our economic and semiconductor industry outlook, we projected out the financial performance of Nvidia through the year 2032. We determined our target share price of \$168.89 - \$182.67 per share for Nvidia using a relative valuation model, as well as a discounted cash flow and economic profit analysis.

DCF & Economic Profit Analysis

Implied Share Price: \$182.67

We believe that the discounted cash flow and economic profit analysis delivers the most accurate valuation range for Nvidia, as it mostly closely takes into consideration the unique business characteristics of the company. In building out these intrinsic valuation models, we forecasted out free cash flow generation.

To project out free cash flow, we began by first projecting out the income statement.

Income Statement Drivers: To project revenues, we evaluated recent growth of both reported business segments over the last 5 years. The average annual revenue growth for the graphics and compute and networking segments were 28% and 71% respectively from 2017 - 2022. Pairing that data with our research into the fabless semiconductor space's prospects, we projected very strong growth over the next 5 years, with the industry maturing and growth slowing towards 2032.

Cost of revenue for Nvidia has improved steadily over the last 10 years, with gross margin improving roughly 10%. As the industry matures, we believe there will be an increased focus on profitability, and Nvidia's operational improvements in recent years signal it can execute changes necessary to do so. As such, we forecast that Nvidia will make steady improvements to its

cost of revenue as a percentage of sales, with gross margin rising from 64.93% in 2022 to 74.98% in 2032.

Research & Development expenses have been the most volatile income statement line item as R&D spend is tied to largely unpredictable technology advances. As such, we forecast that R&D as a percentage of revenues stays in line with the most recent reported financials, at 19.57%.

Using our projected income statement, balance sheet and cash flow statement we forecasted free cash flow generation. Next, we calculated a discount rate to bring the value of our projected free cash flows to the present.

Cost of Equity: We used the CAPM formula to calculate the cost of equity for Nvidia. Our risk-free rate was the current yield on the US 10-year treasury. The market risk premium used in the calculation was Aswath Damodaran's implied premium as of April 2023. For Nvidia's beta, we used the 5-year raw beta found on Bloomberg. With these inputs, we calculated Nvidia's cost of equity is 12.74%.

WACC: Nvidia's capital structure is comprised of 98.26% equity and 1.74% debt. We calculated Nvidia's after cost of debt using the YTM on its 10-year bond, which equaled 3.02%. With these inputs, we calculated Nvidia's WACC to be 12.57%.

Our discounted cash flow and economic profit model was built by calculating free cash flow and NOPLAT for 2023 - 2032 and discounting those drivers by our WACC to the present value. For both models, necessary adjustments were made to get from implied enterprise value to implied equity value. After dividing by shares outstanding, our implied share price came in at **\$182.67** for both models.

Relative Valuation Analysis

Implied Share Price: \$104.14 - \$113.77

Projection Period: 2023 - 2024

Peer companies: Advanced Micro Devices (AMD), QUALCOMM (QCOM), Broadcom (AVGO), Intel (INTC), and Texas Instruments (TXN)

As the semiconductor industry is controlled by a handful of companies, we felt that it was best to compare Nvidia to the other leading forces within the industry. We quickly observed that Nvidia trades far higher relative to its peers, some of whom have dominated the industry for countless years.

Due to the need to specialize within the semiconductor industry, the drivers and position a semiconductor can be in can be vastly different than a peer. Because of this, in the case of Nvidia, it is

more beneficial to evaluate its intrinsic characteristics. Thus, we focus our target share price on our DCF/EP approach, rather than our relative valuation. The disconnect between the output of our DCF/EP models versus the relative P/E model is evidence of this reality.

Dividend Discount Model

Implied Share Price: \$88.73

Nvidia is a fast-growing firm, and has been focused on reinvesting capital, rather than distributing out dividends to equity holders. Nvidia is investing capital into graphics and compute and networking segments to drive continued growth. For this reason, the DDM is not a practical valuation tool. We have not included this into our target price range.

Determining Price Range

To determine our price range, we weighted the DCF valuation 80% and the Relative Valuation Analysis 20%. We choose to weight the DCF by this because we believe it captures the intrinsic advantages of Nvidia. The relative valuation analysis of \$113.77 was weighted 20% because Nvidia is currently a market leader in the industry, while the comparables have weaker product and service lines.

Sensitivity Analysis

WACC & CV NOPLAT Growth

The first variables we chose to build a sensitivity table for was Nvidia's WACC and continuing value NOPLAT growth rate. We chose these two variables because they are very important inputs for our DCF and EP analysis. The continuing value, or value of the business beyond the explicit projection period, generally makes up the majority of the total value produced by these methodologies. Thus, seeing how changes in these assumptions affect price is essential.

We estimated our WACC to be in a range of 9.57% - 15.57%, with our CV growth rate to be between 4.25% - 5.75%. With these inputs, we arrived at a share price range of **\$127 - \$292**. We believe that these inputs are easily attainable, as NOPLAT growth can easily fluctuate depending on current market conditions.

		CV NOPLAT Growth							
		182.67	4.25%	4.50%	4.75%	5.00%	5.25%	5.50%	5.75%
Wacc	9.57%	292.25	302.28	313.34	325.62	339.32	354.71	372.11	
	10.57%	239.59	245.99	252.93	260.50	268.78	277.88	287.92	
	11.57%	201.71	206.02	210.64	215.61	220.97	226.78	233.09	
	12.57%	173.06	176.06	179.26	182.67	186.31	190.21	194.39	
	13.57%	151.17	153.34	155.64	158.07	160.65	163.39	166.30	
	14.57%	133.58	135.19	136.88	138.66	140.53	142.51	144.60	
	15.57%	119.29	120.50	121.77	123.10	124.49	125.96	127.50	

Beta & Equity Risk Premium

Another set of variables we evaluated were Nvidia's beta and the equity risk premium used in the cost of equity calculation. Both of these inputs affect the cost of equity and WACC, one of the biggest drivers of a valuation range. Because of this, we sensitized these variables to note their affect.

Our table consisted of beta ranging from 1.58 – 2.18 and the equity risk premium ranging from 4.58% - 5.12%. This led to an implied valuation range of **\$139 - \$255**.

Nvidia's current beta is quite high, as the company matures this input coming down could greatly impact the valuation as seen in the chart. On the other hand, the equity risk premium is changing every month based on the current return minus the risk-free rate. As both of these numbers float, we believed that it was best to test a range of both these numbers.

		Beta							
		182.67	1.58	1.68	1.78	1.88	1.98	2.08	2.18
Equity Risk Premium	4.58%	255.12	233.80	215.48	199.57	185.65	173.36	162.45	
	4.68%	247.38	226.76	209.03	193.64	180.15	168.25	157.67	
	4.78%	240.06	220.10	202.93	188.01	174.94	163.40	153.14	
	4.88%	233.11	213.78	197.13	182.67	169.99	158.79	148.84	
	4.98%	226.52	207.77	191.63	177.59	165.28	154.41	144.74	
	5.08%	220.25	202.06	186.39	172.76	160.80	150.24	140.84	
	5.12%	217.95	199.97	184.47	170.98	159.15	148.70	139.41	

Pre-tax Cost of Debt & Risk-Free Rate

Nvidia's pre-tax cost of debt and the risk-free rate used in cost of debt and cost of equity calculations greatly affect the implied valuation. Because of this, we analyzed how changes in these variables affect the implied share price.

Our table shows a pre-tax cost of debt range of 3.71% - 4.91% and a risk-free rate range of 3.27% - 3.87%. This gives an implied share price range of **\$174 - \$191**. Note how the cost of debt variances affect share price much more.

		Pre tax Cost of Debt							
		182.67	3.71%	3.91%	4.11%	4.31%	4.51%	4.71%	4.91%
Risk Free Rate	3.27%	191.32	191.28	191.24	191.21	191.17	191.13	191.09	
	3.37%	188.35	188.32	188.28	188.24	188.21	188.17	188.14	
	3.47%	185.46	185.43	185.40	185.36	185.33	185.29	185.26	
	3.57%	182.77	182.73	182.70	182.67	182.63	182.60	182.57	
	3.67%	179.92	179.89	179.86	179.83	179.79	179.76	179.73	
	3.77%	177.26	177.23	177.20	177.17	177.14	177.11	177.08	
	3.87%	174.67	174.64	174.61	174.58	174.55	174.52	174.49	

CV Compute/Networking Growth & CV Graphics Growth

Nvidia's two business segments, compute and networking and graphics, drive the value of Nvidia. The growth of these products is an essential part of the valuation and quality of the business itself.

Our tables show a range of per share values given a range of negative -4.50% CV growth to 9.50% CV growth for each segment. This implies a valuation range of **\$173 - \$193**.

		Compute & Networking Growth							
		182.67	-4.50%	-2.00%	0.50%	2.50%	5.50%	7.50%	9.50%
Graphics Growth	-4.50%	172.83	175.05	177.27	179.05	181.72	183.50	185.27	
	-2.00%	174.12	176.34	178.56	180.34	183.01	184.79	186.57	
	0.50%	175.41	177.63	179.86	181.63	184.30	186.08	187.86	
	2.50%	176.44	178.67	180.89	182.67	185.34	187.11	188.89	
	5.50%	177.99	180.22	182.44	184.22	186.89	188.66	190.44	
	7.50%	179.03	181.25	183.47	185.25	187.92	189.70	191.48	
	9.50%	180.06	182.28	184.51	186.29	188.95	190.73	192.51	

CV EPS Growth & Cost of Equity

Two of the biggest factors in a dividend discount model valuation are the CV EPS growth and cost of equity. As such, we evaluated how changes in these variables affected implied share price.

Our analysis has a CV EPS growth rate range of 3.25% - 4.75%, with a cost of equity range of 9.74% - 15.74%. This gives a potential valuation range of **\$54 - \$158**. Note how with Nvidia's highly equity funded capital structure, the cost of equity has massive effects on share price.

		CV EPS Growth							
		88.73	3.25%	3.50%	3.75%	4.00%	4.25%	4.50%	4.75%
Cost of Equity	9.74%	157.80	161.58	165.68	170.14	175.00	180.33	186.19	
	10.74%	126.51	128.86	131.37	134.07	136.98	140.12	143.53	
	11.74%	103.35	104.85	106.43	108.12	109.92	111.84	113.90	
	12.74%	85.69	86.65	87.67	88.74	89.87	91.08	92.36	
	13.74%	71.90	72.52	73.17	73.86	74.58	75.34	76.14	
	14.74%	60.93	61.33	61.74	62.18	62.63	63.11	63.61	
	15.74%	52.07	52.32	52.58	52.84	53.12	53.41	53.72	

Important Disclaimer

This report was created by students enrolled in the Applied Equity Valuation class at the University of Iowa. The report was originally created to offer an internal investment recommendation for the University of Iowa Krause Fund and its advisory board. The report also provides potential employers and other interested parties with an example of the students' skills, knowledge and abilities. Members of the Krause Fund are not registered investment advisors, brokers or officially licensed financial professionals. The investment advice contained in this report does not represent an offer or solicitation to buy or sell any of the securities mentioned. Unless otherwise noted, the facts and figures included in this report are from publicly available sources. This report is not a complete compilation of data, and its accuracy is not guaranteed. From time to time, the University of Iowa, its faculty, staff, students, or the Krause Fund may hold a financial interest in the companies mentioned in this report.

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NVIDIA
Sensitivity Tables

		CV NOPLAT Growth							
		182.67	4.25%	4.50%	4.75%	5.00%	5.25%	5.50%	5.75%
Wacc	9.57%	182.67	292.25	302.28	313.34	325.62	339.32	354.71	372.11
	10.57%	239.59	245.99	252.93	260.50	268.78	277.88	287.92	
	11.57%	201.71	206.02	210.64	215.61	220.97	226.78	233.09	
	12.57%	173.06	176.06	179.26	182.67	186.31	190.21	194.39	
	13.57%	151.17	153.34	155.64	158.07	160.65	163.39	166.30	
	14.57%	133.58	135.19	136.88	138.66	140.53	142.51	144.60	
	15.57%	119.29	120.50	121.77	123.10	124.49	125.96	127.50	

		Compute & Networking Growth							
		182.67	-4.50%	-2.00%	0.50%	2.50%	5.50%	7.50%	9.50%
Graphics Growth	-4.50%	182.67	172.83	175.05	177.27	179.05	181.72	183.50	185.27
	-2.00%	174.12	176.34	178.56	180.34	183.01	184.79	186.57	
	0.50%	175.41	177.63	179.86	181.63	184.30	186.08	187.86	
	2.50%	176.44	178.67	180.89	182.67	185.34	187.11	188.89	
	5.50%	177.99	180.22	182.44	184.22	186.89	188.66	190.44	
	7.50%	179.03	181.25	183.47	185.25	187.92	189.70	191.48	
	9.50%	180.06	182.28	184.51	186.29	188.95	190.73	192.51	

		Beta							
		182.67	1.58	1.68	1.78	1.88	1.98	2.08	2.18
Equity Risk Premium	4.58%	182.67	255.12	233.80	215.48	199.57	185.65	173.36	162.45
	4.68%	247.38	226.76	209.03	193.64	180.15	168.25	157.67	
	4.78%	240.06	220.10	202.93	188.01	174.94	163.40	153.14	
	4.88%	233.11	213.78	197.13	182.67	169.99	158.79	148.84	
	4.98%	226.52	207.77	191.63	177.59	165.28	154.41	144.74	
	5.08%	220.25	202.06	186.39	172.76	160.80	150.24	140.84	
	5.12%	217.95	199.97	184.47	170.98	159.15	148.70	139.41	


		CV EPS Growth							
		88.73	3.25%	3.50%	3.75%	4.00%	4.25%	4.50%	4.75%
Cost of Equity	9.74%	88.73	157.80	161.58	165.68	170.14	175.00	180.33	186.19
	10.74%	126.51	128.86	131.37	134.07	136.98	140.12	143.53	
	11.74%	103.35	104.85	106.43	108.12	109.92	111.84	113.90	
	12.74%	85.69	86.65	87.67	88.74	89.87	91.08	92.36	
	13.74%	71.90	72.52	73.17	73.86	74.58	75.34	76.14	
	14.74%	60.93	61.33	61.74	62.18	62.63	63.11	63.61	
	15.74%	52.07	52.32	52.58	52.84	53.12	53.41	53.72	


		Pre tax Cost of Debt							
		182.67	3.71%	3.91%	4.11%	4.31%	4.51%	4.71%	4.91%
Risk Free Rate	3.27%	182.67	191.32	191.28	191.24	191.21	191.17	191.13	191.09
	3.37%	188.35	188.32	188.28	188.24	188.21	188.17	188.14	
	3.47%	185.46	185.43	185.40	185.36	185.33	185.29	185.26	
	3.57%	182.77	182.73	182.70	182.67	182.63	182.60	182.57	
	3.67%	179.92	179.89	179.86	179.83	179.79	179.76	179.73	
	3.77%	177.26	177.23	177.20	177.17	177.14	177.11	177.08	
	3.87%	174.67	174.64	174.61	174.58	174.55	174.52	174.49	

NVIDIA
Revenue Decomposition



Fiscal Years Ending Dec. 31	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Graphics			3,468	3,839	4,187	5,822	8,137	10,175	7,639	9,834	15,868	19,835	30,744	44,579	60,182	75,227	90,273	103,814	114,195	122,189	125,243
% Growth				11%	9%	39%	40%	25%	-25%	29%	61%	25%	55%	45%	35%	25%	20%	15%	10%	7%	2%
Compute & Networking			398	579	559	824	1,534	1,453	3,279	6,841	11,046	13,255	19,220	26,908	34,980	43,726	52,471	60,341	66,375	71,022	72,797
% Growth				45%	-3%	47%	86%	-5%	126%	109%	61%	20%	45%	40%	30%	25%	20%	15%	10%	7%	2%
Total Revenue			3,866	4,418	4,746	6,646	9,671	11,628	10,918	16,675	26,914	33,090	49,964	71,487	95,162	118,953	142,744	164,155	180,571	193,210	198,041
Total Revenue % Growth				14%	7%	40%	46%	20%	-6%	53%	61%	23%	51%	43%	33%	25%	20%	15%	10%	7%	2%

NVIDIA Income Statement																
Fiscal Years Ending Dec. 31	2018	2019	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	
Revenue	9,714	11,716	10,918	16,675	26,914	33,090	49,964	71,487	95,162	118,953	142,744	164,155	180,571	193,210	198,041	
Cost of revenue	3,892	4,545	4,150	6,279	9,439	11,274	16,524	22,927	29,568	35,770	41,497	46,080	48,882	50,372	49,651	
Gross profit (loss)	5,822	7,171	6,768	10,396	17,475	21,816	33,441	48,561	65,594	83,183	101,247	118,075	131,688	142,839	148,390	
Operating expenses																
Research & development expenses	1,797	2,376	2,829	3,924	5,268	6,477	9,780	13,993	18,627	23,283	27,940	32,131	35,344	37,818	38,763	
Sales, general & administrative expenses	616	729	712	842	992	1,221	1,844	2,638	3,511	4,389	5,267	6,057	6,663	7,129	7,308	
Depreciation and Amortization	199	262	381	1,098	1,174	1,206	1,515	1,903	2,391	3,003	3,773	4,740	5,955	7,480	9,397	
Total operating expenses	2,612	3,367	3,922	5,864	7,434	8,904	13,138	18,534	24,529	30,676	36,980	42,928	47,962	52,428	55,468	
Income (loss) from operations	3,210	3,804	2,846	4,532	10,041	12,912	20,302	30,027	41,066	52,507	64,266	75,147	83,727	90,411	92,922	
Interest income	69	136	178	57	29	69	72	76	79	83	87	92	96	101	106	
Interest expense	61	58	52	184	236	396	403	458	527	607	694	789	891	996	1,108	
Other, net	(22)	14	(2)	4	107	107	107	107	107	107	107	107	107	107	107	
Other income (expense), net	(14)	92	124	(123)	(100)	572	583	641	714	797	888	988	1,095	1,204	1,321	
Income (loss) before income tax	3,196	3,896	2,970	4,409	9,941	12,340	19,720	29,386	40,352	51,709	63,378	74,159	82,632	89,207	91,601	
Income tax expense (benefit)	149	(245)	174	77	189	3,085	4,930	7,346	10,088	12,927	15,845	18,540	20,658	22,302	22,900	
Net income (loss)	3,047	4,141	2,796	4,332	9,752	9,255	14,790	22,039	30,264	38,782	47,534	55,619	61,974	66,905	68,700	
Net income per share:																
Net income (loss) per share - basic	1	2	1	2	4	4	6	9	12	15	19	22	25	27	27	
Weighted average shares used in per share computation:																
Total Basic Shares Outstanding	2,424	2,424	2,448	2,480	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506	
Total Weighted Average Shares Outstanding	599	608	609	2,467	2,496	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506	
Dividend per share			0.57	0.64	0.16	0.164	0.168	0.172	0.176	0.180	0.184	0.188	0.193	0.198	0.202	

NVIDIA																
Balance Sheet																
Fiscal Years Ending Dec. 31	2017	2018	2019	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Current assets:																
Cash & cash equivalents	1766	4002	782	10896	847	1990	9,289	21,197	39,403	64,788	97,535	137,476	184,030	235,445	290,399	346,078
Marketable securities	5032	3106	6640	1	10714	19218	20,158	21,143	22,177	23,262	24,399	25,592	26,844	28,157	29,534	30,978
Accounts receivable, net	826	1265	1424	1657	2429	4650	3,342	5,046	7,220	9,611	12,013	14,416	16,579	18,236	19,513	20,001
Inventories	794	796	1575	979	1826	2605	2,437	3,680	5,265	7,008	8,760	10,512	12,089	13,298	14,229	14,585
Prepaid expenses & other current assets	118	86	136	157	239	366	288	435	622	829	1,036	1,243	1,429	1,572	1,682	1,724
Total current assets	8,536	9,255	10,557	13,690	16,055	28,829	35,514	51,501	74,688	105,498	143,743	189,240	240,970	296,708	355,356	413,365
Property & equipment, net	521	997	1,404	1,674	2,149	2,778	3,490	4,384	5,508	6,919	8,692	10,919	13,717	17,232	21,648	27,195
Operating lease assets	-	-	-	618	707	829	1,095	1,375	1,728	2,170	2,727	3,425	4,303	5,406	6,791	8,531
Goodwill	618	618	618	618	4,193	4,349	4,349	4,349	4,349	4,349	4,349	4,349	4,349	4,349	4,349	4,349
Intangible assets, net	104	52	45	49	2,737	2,339	2,362	2,386	2,410	2,434	2,458	2,483	2,508	2,533	2,558	2,584
Deferred income tax assets	-	-	560	548	806	1,222	1,286	1,520	2,037	2,781	3,765	4,988	6,446	8,116	9,937	11,883
Other assets	62	319	668	118	2,144	3,841	4,151	4,486	4,848	5,239	5,662	6,119	6,613	7,146	7,723	8,346
Total assets	9,841	11,241	13,292	17,315	28,791	44,187	52,247	70,002	95,567	129,390	171,396	221,523	278,906	341,490	408,363	476,254
Current liabilities:																
Accounts payable	485	596	511	687	1,201	1,783	1,411	2,000	2,745	3,539	4,294	4,709	5,102	5,183	4,976	4,481
Accrued & other current liabilities	507	542	818	1,097	1,725	2,552	1,924	2,728	3,744	4,827	5,856	6,804	7,263	7,240	6,916	6,191
Short-term debt	-	-	-	-	999	-	-	-	-	-	-	-	-	-	-	-
Total current liabilities	1,788	1,153	1,329	1,784	3,925	4,335	3,335	4,729	6,489	8,366	10,150	11,513	12,364	12,423	11,892	10,671
Long-term debt	1,983	1,985	1,988	1,991	5,964	10,946	11,143	12,660	14,569	16,758	19,160	21,802	24,611	27,508	30,600	33,768
Long-term operating lease liabilities	-	-	-	561	634	741	980	1,231	1,547	1,943	2,441	3,067	3,853	4,840	6,080	7,638
Other long-term liabilities	277	632	633	775	1,375	1,553	1,532	2,313	3,310	4,406	5,508	6,609	7,601	8,361	8,946	9,170
Total liabilities	4,048	3,770	3,950	5,111	11,898	17,575	16,991	20,933	25,914	31,473	37,259	42,991	48,429	53,132	57,518	61,247
Shareholders equity:																
Common Stock and Additional paid-in capital	4,709	5,352	6,052	7,046	8,722	10,388	10,388	10,388	10,388	10,388	10,388	10,388	10,388	10,388	10,388	10,388
Treasury stock, at cost	5,039	6,650	9,263	9,814	10,756	-	-	-	-	-	-	-	-	-	-	-
Accumulated other comprehensive income (loss)	(16)	(18)	(12)	1	19	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
Retained earnings (accumulated deficit)	6,108	8,787	12,565	14,971	18,908	16,235	24,879	38,692	59,275	87,540	123,761	168,155	220,100	277,981	340,467	404,630
Total shareholders' equity	5,762	7,471	9,342	12,204	16,893	26,612	35,256	49,069	69,652	97,917	134,138	178,532	230,477	288,358	350,844	415,007
Total liabilities and shareholders' equity	9,810	11,241	13,292	17,315	28,791	44,187	52,247	70,002	95,567	129,390	171,396	221,523	278,906	341,490	408,363	476,254

NVIDIA
Historical Cash Flow Statement



<i>Fiscal Years Ending Dec. 31</i>	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash flows from operating activities:									
Net income (loss)	440	631	614	1,666	3,047	4,141	2,796	4,332	9,752
Adjustments to reconcile net income to net cash provided by operating activities:									
Stock-based compensation expense	136	158	204	247	391	557	844	1,397	2,004
Depreciation & amortization	239	220	197	187	199	262	381	1,098	1,174
Deferred income taxes	15	83	134	197	(359)	(315)	18	(282)	(406)
Losses (gains) on investments in non-affiliates, net	-	-	-	-	-	-	(1)	-	(100)
Other	24	24	19	11	18	(45)	5	(20)	47
<i>Changes in operating assets and liabilities, net of acquisitions:</i>									
Accounts receivable	29	(49)	(32)	(321)	(440)	(149)	(233)	(550)	(2,215)
Inventories	25	(95)	66	(375)	2	(776)	597	(524)	(774)
Prepaid expenses & other assets	7	4	(16)	(18)	21	(55)	77	(394)	(1,715)
Accounts payable	(20)	(27)	(11)	184	90	(135)	194	363	568
Accrued & other current liabilities	(32)	5	39	(135)	33	256	54	239	581
Other long-term liabilities	-	(41)	(97)	(14)	481	2	28	163	192
Net cash provided from operating activities	835	906	1,175	1,672	3,502	3,743	4,761	5,822	9,108
Cash flows from investing activities:									
Proceeds from maturities of marketable securities	585	865	1,036	969	1,078	7,232	4,744	8,792	15,197
Proceeds from sales of marketable securities	1,927	1,372	2,102	1,546	863	428	3,365	527	1,023
Purchases of marketable securities	(3,065)	(2,862)	(3,477)	(3,134)	(36)	(11,148)	(1,461)	(19,308)	(24,787)
Purchases related to property & equipment & intangible assets	(255)	(122)	(86)	(176)	(593)	(600)	(489)	(1,128)	(976)
Acquisitions, net of cash acquired	(17)	-	-	-	-	-	-	(8,524)	(263)
Investments & other, net	-	-	-	-	-	-	(14)	(34)	(24)
Net cash flows from (used in) investing activities	(806)	(727)	(400)	(793)	1,278	(4,097)	6,145	(19,675)	(9,830)
Cash flows from financing activities:									
Issuance of debt, net of issuance costs	-	-	-	-	-	-	-	4,968	4,977
Proceeds related to employee stock plans	-	-	-	-	-	137	149	194	281
Payments related to tax on restricted stock units	-	-	-	-	(612)	(1,032)	(551)	(942)	(1,904)
Repayment of debt	-	-	-	-	-	-	-	-	(1,000)
Dividends paid	(181)	(186)	(213)	(261)	(341)	(371)	(390)	(395)	(399)
Principal payments on property & equipment	-	-	-	-	-	-	-	(17)	(83)
Other	(5)	(3)	(3)	(7)	(9)	(5)	-	(4)	(7)
Net cash flows from (used in) financing activities	390	(834)	(676)	291	(2,544)	(2,866)	(792)	3,804	1,865
Change in cash & cash equivalents	419	(655)	99	1,170	2,236	(3,220)	10,114	(10,049)	1,143
Cash & cash equivalents at beginning of period	733	1,152	497	596	1,766	4,002	782	10,896	847
Cash & cash equivalents at end of period	1,152	497	596	1,766	4,002	782	10,896	847	1,990
<i>Supplemental disclosures of cash flow information:</i>									
Cash paid (received) for income taxes, net	(15)	(14)	(14)	(14)	(22)	(61)	(176)	(249)	(396)
Cash paid for interest	(3)	(17)	(17)	(13)	(55)	(55)	(54)	(138)	(246)

NVIDIA
Forecasted Cash Flow Statement



<i>Fiscal Years Ending Dec. 31</i>	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Net Income (loss)	9,255	14,790	22,039	30,264	38,782	47,534	55,619	61,974	66,905	68,700
Add D&A	1,206	1,515	1,903	2,391	3,003	3,773	4,740	5,955	7,480	9,397
<i>Adjustments to reconcile net income</i>										
Changes in accounts receivable	1308	(1,704)	(2,174)	(2,391)	(2,403)	(2,403)	(2,162)	(1,658)	(1,277)	(488)
Changes in inventories	168	(1,243)	(1,585)	(1,744)	(1,752)	(1,752)	(1,577)	(1,209)	(931)	(356)
Changes in other current assets	78	(147)	(187)	(206)	(207)	(207)	(186)	(143)	(110)	(42)
Changes in accounts payable	(372)	589	745	794	755	415	393	81	(207)	(495)
Changes in other liabilities	(628)	804	1,016	1,083	1,029	948	458	(22)	(324)	(725)
Change in non-current liabilities	(21)	781	997	1,096	1,102	1,102	991	760	585	224
Net cash flows from operating activities	10,995	15,385	22,753	31,287	40,309	49,410	58,276	65,738	72,122	76,215
Changes in goodwill	-	-	-	-	-	-	-	-	-	-
Changes in operating lease assets	(266)	(281)	(352)	(443)	(556)	(699)	(878)	(1,103)	(1,385)	(1,740)
Changes in marketable securities	(940)	(986)	(1,034)	(1,084)	(1,138)	(1,193)	(1,251)	(1,313)	(1,377)	(1,444)
Changes in Deferred Tax Assets	(64)	(235)	(517)	(744)	(984)	(1,222)	(1,459)	(1,670)	(1,821)	(1,946)
Changes in Other Assets	(310)	(335)	(362)	(391)	(423)	(457)	(494)	(534)	(577)	(623)
Changes in Intangible Assets	(23)	(24)	(24)	(24)	(24)	(25)	(25)	(25)	(25)	(26)
Capital Expenditures	(1,918)	(2,409)	(3,027)	(3,802)	(4,776)	(6,000)	(7,538)	(9,470)	(11,896)	(14,945)
Net cash flows from investing activities	(3,520)	(4,269)	(5,315)	(6,489)	(7,901)	(9,596)	(11,645)	(14,114)	(17,082)	(20,724)
Changes in operating leases liabilities	239	251	316	396	498	626	786	987	1,240	1,558
Changes in long term debt	197	1,517	1,909	2,189	2,402	2,642	2,809	2,897	3,092	3,168
Payment of dividends	(611)	(977)	(1,456)	(1,999)	(2,561)	(3,140)	(3,674)	(4,093)	(4,419)	(4,538)
Repurchases of common stock	-	-	-	-	-	-	-	-	-	-
Net cash flows from financing activities	(175)	791	769	586	339	128	(78)	(209)	(87)	188
Net change in cash	7,299	11,908	18,206	25,385	32,746	39,942	46,553	51,416	54,953	55,680
Beg. Cash	1,990	9,289	21,197	39,403	64,788	97,535	137,476	184,030	235,445	290,399
End. Cash	9,289	21,197	39,403	64,788	97,535	137,476	184,030	235,445	290,399	346,078

NVIDIA
Common Size Income Statement



Fiscal Years Ending Dec. 31	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Revenue	100%	100%	100%	100%	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of revenue	45.09%	44.47%	43.89%	41.20%	40.07%	38.79%	38.01%	37.66%	35.07%	34.07%	33.07%	32.07%	31.07%	30.07%	29.07%	28.07%	27.07%	26.07%	25.07%
Gross profit (loss)	54.91%	55.53%	56.11%	58.80%	59.93%	61.21%	61.99%	62.34%	64.93%	65.93%	66.93%	67.93%	68.93%	69.93%	70.93%	71.93%	72.93%	73.93%	74.93%
Operating expenses																			
Research & development expenses	32.34%	29.04%	26.57%	21.17%	18.50%	20.28%	25.91%	23.53%	19.57%	19.57%	19.57%	19.57%	19.57%	19.57%	19.57%	19.57%	19.57%	19.57%	19.57%
Sales, general & administrative expenses	4.76%	5.57%	8.08%	6.87%	6.34%	6.22%	6.52%	5.05%	3.69%	3.69%	3.69%	3.69%	3.69%	3.69%	3.69%	3.69%	3.69%	3.69%	3.69%
Depreciation	5.79%	4.70%	3.93%	2.71%	2.05%	2.24%	3.49%	6.58%	4.36%	3.64%	3.03%	2.66%	2.51%	2.52%	2.64%	2.89%	3.30%	3.87%	4.75%
Total operating expenses	42.89%	39.31%	41.20%	30.81%	26.89%	28.74%	35.92%	35.17%	27.62%	26.91%	26.30%	25.93%	25.78%	25.79%	25.91%	26.15%	26.56%	27.14%	28.01%
Income (loss) from operations	12.01%	16.21%	14.91%	27.99%	33.05%	32.47%	26.07%	27.18%	37.31%	39.02%	40.63%	42.00%	43.15%	44.14%	45.02%	45.78%	46.37%	46.79%	46.92%
Interest income	0.41%	0.60%	0.78%	0.78%	0.71%	1.16%	1.63%	0.34%	0.11%	0.21%	0.14%	0.11%	0.08%	0.07%	0.06%	0.06%	0.05%	0.05%	0.05%
Interest expense	0.25%	0.99%	0.94%	0.84%	0.63%	0.50%	0.48%	1.10%	0.88%	1.20%	0.81%	0.64%	0.55%	0.51%	0.49%	0.48%	0.49%	0.52%	0.56%
Other, net	0.18%	0.30%	0.08%	-0.36%	-0.23%	0.12%	-0.02%	0.02%	0.40%	0.32%	0.21%	0.15%	0.11%	0.09%	0.08%	0.07%	0.06%	0.06%	0.05%
Other income (expense), net	2.42%	2.63%	-2.48%	-1.33%	0.14%	-0.79%	-1.14%	0.74%	0.37%	-1.73%	-1.17%	-0.90%	-0.75%	-0.67%	-0.62%	-0.60%	-0.61%	-0.62%	-0.67%
Income (loss) before income tax	12.35%	16.12%	14.83%	27.57%	32.90%	33.25%	27.20%	26.44%	36.94%	37.29%	39.47%	41.11%	42.40%	43.47%	44.40%	45.18%	45.76%	46.17%	46.25%
Income tax expense (benefit)	1.70%	2.65%	2.57%	3.46%	1.53%	-2.09%	1.59%	0.46%	0.70%	9.32%	9.87%	10.28%	10.60%	10.87%	11.10%	11.29%	11.44%	11.54%	11.56%
Net income (loss)	10.65%	13.47%	12.26%	24.11%	31.37%	35.34%	25.61%	25.98%	36.23%	27.97%	29.60%	30.83%	31.80%	32.60%	33.30%	33.88%	34.32%	34.63%	34.69%



Fiscal Years Ending Dec. 31	2018	2019	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
NOPLAT:															
Sales	9,714	11,716	10,918	16,675	26,914	33,090	49,964	71,487	95,162	118,953	142,744	164,155	180,571	193,210	198,041
Cost of Sales (excl. D&A)	3,892	4,545	4,150	6,279	9,439	11,274	16,524	22,927	29,568	35,770	41,497	46,080	48,882	50,372	49,651
Depreciation & Amortization	199	262	381	1,098	1,174	1,206	1,515	1,903	1,903	3,003	3,773	4,740	5,955	7,480	9,397
Selling, General, and Administrative	616	729	712	842	992	1,221	1,844	2,638	3,511	4,389	5,267	6,057	6,663	7,129	7,308
Research & Development	1,797	2,376	2,829	3,924	5,268	6,477	9,780	13,993	18,627	23,283	27,940	32,131	35,344	37,818	38,763
Plus Interest on Operating Leases	0	0	0	0	1	-	-	-	-	-	-	-	-	-	-
EBITA	3,210	3,804	2,846	4,532	10,042	12,912	20,302	30,027	41,553	52,507	64,266	75,147	83,727	90,411	92,922
Provision for Income Tax	149	(245)	174	77	189	3,085	4,930	7,346	10,088	12,927	15,845	18,540	20,658	22,302	22,900
Tax Shield on interest expense	51.24	48.72	43.68	154.56	198.24	332.88	338.88	385.01	443.06	509.63	582.68	663.02	748.46	836.57	930.59
Less Tax on Interest Income	57.96	114.24	149.52	47.88	24.36	57.82	60.64	63.61	66.72	69.98	73.41	76.99	80.76	84.71	88.85
Plus Tax Shield on Lease Interest	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-
Less Tax on Other, Net	(4)	(4)	2	(0)	1	17	17	17	17	17	17	17	17	17	17
Adjusted Taxes	153	(241)	172	77	188	3,068	4,913	7,329	10,071	12,910	15,827	18,523	20,641	22,284	22,883
Change in Deferred Taxes	(556)	44	333	(300)	(124)	(64)	(235)	(517)	(744)	(984)	(1,222)	(1,459)	(1,670)	(1,821)	(1,946)
NOPLAT	2,501	4,090	3,008	4,155	9,729	9,780	15,155	22,181	30,739	38,612	47,217	55,166	61,416	66,305	68,093
Invested Capital (IC):															
<i>Operating Current Assets</i>															
Normal Cash (6.67% of Sales)	648	781	728	1,112	1,795	2,207	3,333	4,768	6,347	7,934	9,521	10,949	12,044	12,887	13,209
Accounts Receivable, net	1,424	1,657	2,429	4,650	3,342	3,342	5,046	7,220	9,611	12,013	14,416	16,579	18,236	19,513	20,001
Inventories	1,575	979	1,826	2,605	2,437	2,437	3,680	5,265	7,008	8,760	10,512	12,089	13,298	14,229	14,585
Prepaid expenses & other current assets	86	136	157	239	366	288	435	622	829	1,036	1,243	1,429	1,572	1,682	1,724
Total Operating Current Assets	3,733	3,553	5,140	8,606	7,940	8,274	12,493	17,875	23,795	29,743	35,692	41,046	45,151	48,311	49,519
<i>Total Operating Current Liabilities</i>															
Accounts Payable	511	687	1,201	1,783	1,411	1,411	2,000	2,745	3,539	4,294	4,709	5,102	5,183	4,976	4,481
Other Operating Current Liabilities	818	1,097	1,725	2,552	1,924	1,924	2,728	3,744	4,827	5,856	6,804	7,263	7,240	6,916	6,191
Total Operating Current Liabilities	1,329	1,784	2,926	4,335	3,335	3,335	4,729	6,489	8,366	10,150	11,513	12,364	12,423	11,892	10,671
Net Working Capital	5,062	5,337	8,066	12,941	11,275	11,609	17,222	24,364	32,160	39,893	47,205	53,410	57,574	60,203	60,190
Property, Plant, and Equipment, net	997	1,404	1,674	2,149	2,778	3,490	4,384	5,508	6,919	8,692	10,919	13,717	17,232	21,648	27,195
<i>Long-term Operating Assets</i>															
Net Intangible Assets	52	45	49	2,737	2,339	2,362	2,386	2,410	2,434	2,458	2,483	2,508	2,533	2,558	2,584
PV Operating Leases	-	-	618	707	829	1,095	1,375	1,728	2,170	2,727	3,425	4,303	5,406	6,791	8,531
Other Long-Term Operating Assets	668	118	2,144	3,841	4,151	4,151	4,486	4,848	5,239	5,662	6,119	6,613	7,146	7,723	8,346
Total Long-term Operating Assets	720	163	2,811	7,285	7,319	7,608	8,247	8,986	9,844	10,847	12,027	13,423	15,085	17,072	19,461
<i>Less Long-Term Operating Liabilities</i>															
Deferred Revenues, non-current	172	172	172	172	172	172	172	172	172	172	172	172	172	172	172
Other Long-term Operating Liabilities	633	775	1,375	1,553	1,532	1,532	2,313	3,310	4,406	5,508	6,609	7,601	8,361	8,946	9,170
Total Long-term Operating Liabilities	805	947	1,547	1,725	1,704	1,704	2,486	3,482	4,578	5,680	6,781	7,773	8,533	9,118	9,342
Invested Capital	5,974	5,957	11,004	20,650	19,668	21,003	27,368	35,375	44,345	53,752	63,370	72,778	81,358	89,805	97,505
Free Cash Flow (FCF):															
NOPLAT	2,501	4,090	3,008	4,155	9,729	9,780	15,155	22,181	30,739	38,612	47,217	55,166	61,416	66,305	68,093
Change in IC	2,108	(16)	5,047	9,646	(982)	1,335	6,364	8,007	8,970	9,407	9,618	9,408	8,580	8,447	7,700
FCF	393	4,106	(2,039)	(5,491)	10,711	8,445	8,790	14,174	21,769	29,205	37,599	45,758	52,836	57,858	60,393
Return on Invested Capital (ROIC):															
NOPLAT	2,501	4,090	3,008	4,155	9,729	9,780	15,155	22,181	30,739	38,612	47,217	55,166	61,416	66,305	68,093
Beginning IC	3,866	5,974	5,957	11,004	20,650	19,668	21,003	27,368	35,375	44,345	53,752	63,370	72,778	81,358	89,805
ROIC	65%	68%	50%	38%	47%	50%	72%	81%	87%	87%	88%	87%	84%	81%	76%
Economic Profit (EP):															
Beginning IC	3,866	5,974	5,957	11,004	20,650	19,668	21,003	27,368	35,375	44,345	53,752	63,370	72,778	81,358	89,805
x (ROIC - WACC)	52%	56%	38%	25%	35%	37%	60%	68%	74%	74%	75%	74%	72%	69%	63%
EP	2,015	3,339	2,259	2,771	7,133	7,307	12,514	18,740	26,291	33,036	40,458	47,198	52,265	56,075	56,801

NVIDIA*Weighted Average Cost of Capital (WACC) Estimation***Cost of Equity:**

Risk-Free Rate	3.57%
Beta	1.88
Equity Risk Premium	4.88%

Cost of Equity:	12.74%
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ASSUMPTIONS:

10 year treasury bond
 5-year raw beta on Bloomberg
 Damodoran's implied ERP as of April 2023

Cost of Debt:

Risk-Free Rate	3.57%
Implied Default Premium	0.74%
Pre-Tax Cost of Debt	4.31%
Marginal Tax Rate	29.84%

After-Tax Cost of Debt	3.02%
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10 year treasury bond

YTM of Nvidia's 10-year bond

Market Value of Common Equity:

Total Shares Outstanding	2.51
Current Stock Price	\$267.58

MV of Equity	670.56
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MV Weights

98.29%

Market Value of Debt:

Short-Term Debt	-
Current Portion of LTD	
Long-Term Debt	10.946
PV of Operating Leases	0.741

MV of Total Debt	11.69
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1.71%

Market Value of the Firm	682.24
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100.00%

Estimated WACC

12.57%

NVIDIA
Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models

Key Inputs:

CV Growth of NOPLAT	5.00%
CV Year ROIC	76%
WACC	12.57%
Cost of Equity	12.74%

Fiscal Years Ending Dec. 31	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
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DCF Model:

Free Cash Flow (FCF)	8445.40	8790.5	14174.0	21768.7	29204.7	37598.5	45757.7	52836.4	57857.9	60392.85
Continuing Value (CV)										839751.93
PV of FCF	7502.1	6936.4	9935.2	13554.4	16153.4	18473.2	19971.0	20484.7	19926.1	289207.6

Value of Operating Assets: \$ 422,144.13

Excess Cash	8627.5				661.8					
Marketable Securities	20157.8									
ESOP	-1081.5									
Other non current asset	4151.0									
Debt	-11687.0									

Value of Equity \$ 442,311.82

Shares Outstanding	2506.0
Intrinsic Value of Last FYE	\$ 176.50
Implied Price as of Today	\$ 182.67

EP Model:

Economic Profit (EP)	7307.5	12514.1	18739.9	26290.6	33036.3	40457.9	47197.7	52265.0	56075.2	56800.6
Continuing Value (CV)										749946.6
PV of EP	6491.2	9874.7	13135.7	16370.0	18272.7	19878.2	20599.4	20263.2	19312.1	258279.0

Total PV of EP	402476.1
Invested Capital (last FYE)	19668.0

Value of Operating Assets: \$ 422,144.13

Excess Cash	8627.5
Debt	-11687.0
Marketable Securities	20157.8
Esop	-1081.5
Other Non Current Asset	4151.0

Value of Equity \$ 442,311.82

Shares Outstanding	2506.0
Intrinsic Value of Last FYE	\$ 176.50
Implied Price as of Today	182.67

NVIDIA

Dividend Discount Model (DDM) or Fundamental P/E Valuation Model



Fiscal Years Ending Dec. 31	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Periods	1	2	3	4	5	6	7	8	9	9
EPS	\$ 3.69	\$ 5.90	\$ 8.79	\$ 12.08	\$ 15.48	\$ 18.97	\$ 22.19	\$ 24.73	\$ 26.70	\$ 27.41

Key Assumptions

CV growth of EPS	4.00%
CV Year ROE	19.58%
Cost of Equity	12.74%

Future Cash Flows

P/E Multiple (CV Year)																			9.10
EPS (CV Year)																			\$ 27.41
Future Stock Price																			\$ 249.58
Dividends Per Share	0.16	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.20										
Discounted Cash Flows	\$ 0.15	\$ 0.13	\$ 0.12	\$ 0.11	\$ 0.10	\$ 0.09	\$ 0.08	\$ 0.07	\$ 0.07	\$ 84.82									

Intrinsic Value as of Last FYE \$ 85.74

Implied Price as of Today **\$ 88.73**

NVIDIA
Relative Valuation Models



Ticker	Company	Price	EPS 2023E	EPS 2024E	P/E 23	P/E 24	Est. 5yr EPS gr.	PEG 23	PEG 24
AMD	Advanced Micro Devices	\$98.01	\$3.09	\$4.28	31.72	22.90	10.0	3.17	2.29
QCOM	QualComm	\$120.16	\$9.44	\$11.47	12.73	10.48	10.0	1.27	1.05
AVGO	Broadcom Inc.	\$636.17	\$41.48	\$44.24	15.34	14.38	10.0	1.53	1.44
INTC	Intel Corp.	\$32.67	\$0.47	\$1.79	69.51	18.25	10.0	6.95	1.83
TXN	Texas Instruments	\$186.01	\$7.52	\$8.37	24.74	22.22	10.0	2.47	2.22
Average					30.81	17.65		3.08	1.76

NVDA	NVIDIA	\$267.58	\$3.69	\$5.90	72.5	45.3	10.0	7.2	4.5
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Implied Relative Value:	
P/E (EPS23)	\$ 113.77
P/E (EPS24)	\$ 104.14
PEG (EPS23)	\$ 113.77
PEG (EPS24)	\$ 104.14
P/B	\$ 321.91
P/Tangible BV	\$ 268.26

NVIDIA
Present Value of Operating Lease Obligations


Fiscal Years Ending Sep. 30	2014	2015	2016	2017	2018	2019	2020	2021	2022
Year 1	74.0	76.7	75.0	42.0	63.0	100.0	121.0	152	176
Year 2	43.9	33.4	41.0	28.0	51.5	62.3	109.5	135	162
Year 3	43.9	33.4	41.0	28.0	51.5	62.3	109.5	115	136
Year 4	25.7	18.4	23.0	14.5	34.5	62.3	70.5	94	124
Year 5	25.7	18.4	23.0	13.0	34.5	65.5	70.5	86	114
Thereafter	34.7	27.5	21.0	13.0	11.0	65.5	292.0	288	288
Total Minimum Payments	0.2	0.2	224.0	138.5	246.0	418.0	773.0	870.0	1000
Less: Cumulative Interest	0.0	0.0	219.3	134.0	240.8	412.2	766.6	862.7	993.0
PV of Minimum Payments	3.0	3.7	4.7	4.5	5.2	5.8	6.4	7.3	7.0

Implied Interest in Year 1 Payment		0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5
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Pre-Tax Cost of Debt	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%
Years Implied by Year 6 Payment	3.8	3.8	5.0	6.4	4.0	4.9	4.4		
Expected Obligation in Year 6 & Beyond	0.674	0.836	0.8	0.834	0.96	1.061	1.143		

Present Value of Lease Payments

PV of Year 1	0.7	0.9	1.2	1.2	1.4	1.5	1.6	141.8	164.2
PV of Year 2	0.7	0.8	1.1	1.1	1.3	1.4	1.5	117.5	141.0
PV of Year 3	0.6	0.7	1.0	0.9	1.1	1.2	1.4	93.3	110.4
PV of Year 4	0.5	0.7	0.8	0.7	0.8	0.9	1.0	71.2	93.9
PV of Year 5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	60.7	80.5
PV of 6 & beyond	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capitalized PV of Payments	3.0	3.7	4.7	4.5	5.2	5.8	6.4	7.3	7.0