Universidade do Minho
Escola de Economia e Gestão

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Equity Research Report: NVIDIA

April 2024

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Equity Research Report: NVIDIA

Master's Project
Master in Finance

Supervised by
Professor Doutor Artur Jorge Pereira Rodrigues

April 2024

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I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

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Lastly, I want to thank every teacher I came across throughout the 5 years I have been a student at the University of Minho, but in special to Professor Nelson Areal whom, unknowingly, through his 'Financial Investments' class, made my love for finance apparent and that, consequently, put me on the path of this master's degree.

"If I have seen further, it is by standing on the shoulders of Giants" – Sir Issac Newton, 1675

RESUMO

O objetivo deste Equity Research Report é fornecer uma análise detalhada da NVIDIA Corporation (NASDAQ: NVDA), uma empresa líder no setor de semicondutores, especializada em unidades de processamento gráfico e computação de alto desempenho para inteligência artificial e veículos autónomos. Seguindo as directrizes recomendadas pelo Instituto CFA para este tipo de relatório, a análise começa com uma visão geral da história da NVIDIA até às suas decisões de negócio atuais, fazendo um resumo da visão geral dos segmentos de negócio e operações da empresa. Segue-se uma perspectiva abrangente da indústria dos semicondutores, a delinear os fatores determinantes da indústria, o funcionamento da cadeia de abastecimento e posicionamento competitivo, bem como uma análise ESG, abrangendo informações relevantes para a crescente onda de investimento sustentável.

O restante do relatório foca-se na análise financeira e na avaliação da empresa. A maioria das informações financeiras utilizadas foi obtida dos relatórios anuais e das apresentações para investidores da NVIDIA. A avaliação foi realizada principalmente utilizando a metodologia de avaliação de Fluxos de Caixa Descontado (DCF). Para apoiar o resultado da avaliação DCF, várias análises de sensibilidade e uma simulação Monte Carlo foram realizadas. Para fundamentar ainda mais os resultados, foi utilizada uma avaliação relativa. O relatório conclui com uma demonstração dos riscos potenciais associados ao investimento na NVIDIA, estratificando os riscos com base em diferentes níveis de probabilidade e impacto.

A avaliação DCF resultou numa recomendação de COMPRA, com um preço-alvo de US$ 739, projetado para o final de 2024, com um potencial de valorização de 20.1% em relação ao preço de 31 de janeiro de 2024, de US$ 615.

Palavras-chave: Análise de Sensibilidade, Avaliação de Fluxo de Caixa Descontado, Avaliação Relativa, Indústria de Semicondutores, Inteligência Artificial, NVIDIA.

ABSTRACT

The aim of the following Equity Research Report is to provide a detailed analysis of NVIDIA Corporation (NASDAQ: NVDA), a leading technology company of the semiconductors sector, specializing in graphics processing units and high-performance computing for artificial intelligence and self-driving vehicles.

Following the guidelines provided by the CFA Institute for this type of report, the analysis starts with an overview of NVIDIA's history leading to their current business decisions, giving a rundown on the company's business segments and operations. A comprehensive outlook of the semiconductors industry follows, outlining industry drivers, supply chain workings and competitive positioning, as well as an ESG analysis, encompassing information relevant to the up-and-coming wave of sustainable investment.

The remainder of the report focuses on the financial analysis and valuation of the company. The majority of the financial information used was sourced from NVIDIA's annual reports and investor presentations. The valuation was mainly performed using the Discounted Cash Flow (DCF) valuation methodology. To support the outcome of the DCF valuation, several sensitivity analyses and a Monte-Carlo simulation were performed. To further substantiate the results, a relative valuation was used. The report concludes with a layout of potential risks associated with investing in NVIDIA, layering the risks based on different levels of likelihood and impact.

The DCF valuation resulted in a BUY recommendation, with a price target of US$ 739, projected for the end of 2024, with a 20.1% upside potential from the closing price of January 31st, 2024, of US$ 615.

Keywords: Artificial Intelligence, Discounted Cash Flow Valuation, NVIDIA, Relative Valuation, Semiconductors Sector, Sensitivity Analysis.

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NVIDIA

January 2024 - BUY

NVIDIA: Providing the Shovels for Tech's Gold Rush

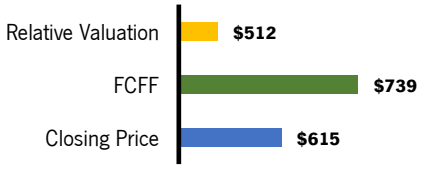
Much like the indispensable shovel during the gold rush era, NVIDIA's products serve as the foundations empowering researchers and businesses to push towards new frontiers in the future landscape of the digital realm.

Table 1 - Investment Recommendation

INVESTMENT RECOMMENDATION	
Price Target (2024YE)	**US$739**
Upside Potential	**20.1%**
Closing Price (January 31st, 2024)	US$615
Stock Exchange	NASDAQ
Ticker	NVDA
Industry	Semiconductors
52-Week Range	$202 - $823.94
Shares Outstanding	2.5 billion
Market Cap	1.534 trillion

Source: Author Estimates and Yahoo Finance

Figure 1 - Valuation Price Targets



Source: Author Estimates

Table 2 - Industry's Abbreviations

Abbreviations	
GPU	Graphics Processing Unit
CPU	Central Processing Unit
GB	Gigabyte
nm	Nanometer
AI	Artificial Intelligence
API	Application Programming Interface
SoC	System-on-Chip
CAD	Computer-aided Design
AV	Autonomous Vehicles
HPC	High-Performance Computing
RAM	Random Access Memory
VRAM	Video RAM

Investment Summary

NVIDIA Corporation, an American tech company of the semiconductors sector, specializes in developing graphics processing units for gaming computers, development of artificial intelligence, self-driving vehicles and professional visualization.

BUY is my recommendation for NVIDIA Corporation (NASDAQ: NVDA) with a price target of **$739/sh** for 2024YE using a DCF model. This forecasted price shows an upside potential of **20.1%** from the closing price of **$615/sh** on January 31st, 2024. This recommendation is established on three key value drivers: **(1)** Broad-range application of AI technology, **(2)** Consistent dominant positioning on emerging technologies, **(3)** Unlocking markets with major partnerships.

Broad-Range Application of AI Technology

NVIDIA's broad selection of AI-driven applications from healthcare to spaceflight to military applications will create and otherwise empower existing industries, leveraging information for sharper insights and efficiency. NVIDIA's technology is as wide range as AI is, as its products are the building block of AI infrastructure. With the company being able to capitalize on the recent explosive demand, a strong growth opportunity is apparent as AI reaches for new industries and finds new applications.

Consistent Dominant Positioning on Emerging Technologies

NVIDIA has a very proactive approach concerning new technologies, consistently pushing the boundaries of innovation. It was the case with the GPU, CUDA and now, AI-focused hardware. NVIDIA always finds itself ahead of the curve, offering quality equipment before any competitor does, or before the market even exists, establishing a dominant position in markets early on. This sustained technological advancement gives the company a competitive edge and allows for sustainable and recurring growth opportunities.

Unlocking Markets with Major Partnerships

Strategic partnership with industry leaders in gaming hardware, cloud computing and AI, and automotive have been and will continue to be instrumental in maintaining a dominant market position in the long run, enabling NVIDIA to reach for new market segments, new customers and ultimately, new growth opportunities. As competition increases and substitute products enter the market, companies like NVIDIA try to differentiate their products. Partnerships are key for the company to sustain their growth and create value.

Business Description

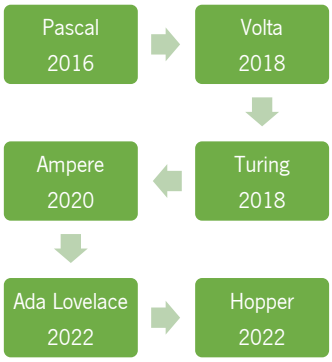
Foundation and History

NVIDIA was founded 30 years ago, in 1993 by Jen-Hsun Huang, a microprocessor designer at AMD; Chris Malachowsky, an engineer at Sun Microsystems; and Curtis Priem, a graphics chip designer at IBM and Sun Microsystems. All three were at the

Figure 2 - NV1 Graphics Card

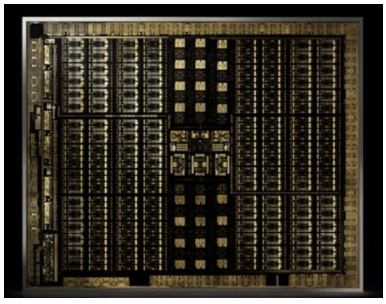
Source: Vintage3D

Figure 3 - NVIDIA Recent Chip Architectures



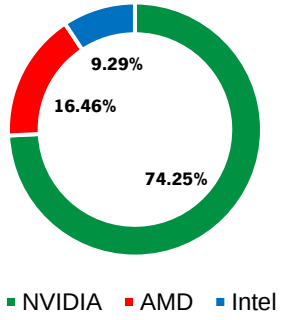
Source: NVIDIA

Figure 4 - NVIDIA's Tensor Core



Source: NVIDIA

Figure 5 - Gaming GPU Market Share



Source: Steam Hardware & Software Survey

forefront of processing technology in remarkably innovative companies at the time. According to Huang, the three co-founders believed that accelerated computing, with emphasis on graphics-based processing was the next great technological challenge and that one of its most befitting applications, the video game market, would create a substantial sales volume. Thus, NVIDIA was born, using video games as the engine to drive funds towards R&D to solve computational problems.

In 1995, NVIDIA released its first graphics card, the NV1, which was deemed unsuccessful given the lack of demand for the card caused by an incompatibility in rendering with Microsoft's DirectX multimedia API, the gaming industry's choice for development.

NVIDIA's first success was the RIVA 128 processor, released in 1997, which sold a million units in 4 months, at a time when the company only had a month of salary's worth of available funds.

In 1999, the company went public on the NASDAQ with the ticker "NVDA", raising $42 million with shares at $12, closing the day at almost $20, prompting a valuation of $626 million.

Later that year, NVIDIA releases what is considered its first graphical processing unit (GPU), the GeForce 256, which enabled better 3D performance when compared to rest of the industry. This GPU set itself apart from others by integrating hardware that performed calculations otherwise relied upon the Central Processing Unit (CPU).

To enable developers to interface with the GPUs, NVIDIA released CUDA in 2006, a software API that allows direct control of the device's instruction set designed to work with common programming languages. Its main use was to use the graphics accelerators to do mathematical calculations in parallel.

From then on NVIDIA kept building upon the GeForce GPU, expanding towards enterprise with the creation of Quadro, a GPU line dedicated to workstations, mainly used for computed assisted design (CAD) and Tegra, a system-on-chip (SoC) architecture series for mobile devices such as smartphones and personal assistants.

It wasn't until the mid-2010s that NVIDIA found a new application of its technology, both the GPU and CUDA. AlexNet, a breakthrough image recognition neural network capable of recognizing images better than humans was created by Alex Krizhevsky in 2012, trained using 2 NVIDIA GPUs, rose spark to artificial intelligence. NVIDIA's CEO then suddenly decided the company would focus on AI overnight and ended up creating its first A.I. Supercomputer, the DGX-1, which was first delivered to a research group at OpenAI. The gamble would pay off in late 2022 when OpenAI released ChatGPT to the world creating an uproar for AI around the world. Given the news that it was developed using NVIDIA's technology, demand for the AI-focused equipment has surged.

Business Segments

As of now, NVIDIA specializes in markets where GPU-based visual and accelerated computing platforms can provide significant benefits. They focus on four main markets: Gaming, Professional Visualization, Data Center, and Automotive.

In the **Gaming** market, NVIDIA's GPUs enhance the gaming experience by improving graphics quality, increasing frame rates, and incorporating realistic lighting and physics. They offer software libraries and applications to optimize gaming settings and enable features like real time ray-tracing and virtual reality. NVIDIA provides products such as GeForce RTX and GeForce GTX GPUs for PC gaming, SHIELD devices for gaming and streaming, and cloud-based gaming services like GeForce NOW. These GPUs are sold to the final customer through retail or to companies like ASUS, Gigabyte and MSI, who integrate the GPUs onto their own products or companies such as EVGA and Zotac, who modify the GPUs.

In the **Professional Visualization** market, NVIDIA works with software vendors to optimize their offerings for their GPUs. Their solutions enhance productivity and introduce new capabilities in industries like automotive, media and entertainment, architecture, and medical imaging. NVIDIA's software enables designers to interact with 3D models in real time, generate photorealistic renderings, and create immersive experiences. Their RTX

brand GPUs are also used for workstations and offer advanced features for professional designers. Companies such as Autodesk, Adobe, and Pixar, all rely on NVIDIA Quadro and RTX for visualization and professional graphics tasks.

In the **Data Center** market, NVIDIA's accelerated computing platform addresses AI and high-performance computing (HPC) applications. Their GPUs and software tools enable deep learning, machine learning, and scientific computing workloads.

NVIDIA collaborates with leading organizations across various industries to accelerate AI adoption and provides a range of GPU options for servers and cloud-based solutions. Their AI-focused GPUs have also made significant contributions to fields like aerospace, bio-science research, and energy exploration, through cloud service providers such as Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP) and Oracle Cloud or On-Premises Server Infrastructure, partnering with Dell, Hewlett Packard, and Lenovo.

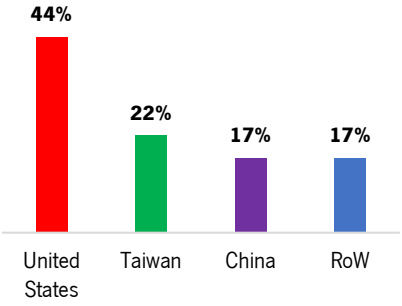
In the **Automotive** market, NVIDIA offers solutions for cockpit infotainment, autonomous vehicles (AV), and AI assistance. They work with numerous partners in the automotive ecosystem to develop AI systems for self-driving vehicles. These include Mercedes-Benz, Jaguar, Land Rover, etc., with a 6-year pipeline of other car companies and a wide-range of up-and-coming Asian car brands (**Figure 6**). NVIDIA's DRIVE platform combines deep learning and surround vision to enable autonomous driving. Their hardware and software solutions are scalable and can receive over-the-air updates to enhance features throughout the vehicle's lifespan.

Overall, NVIDIA leverages their GPU technology and expertise to provide value in these specialized markets, meeting consumer and enterprise demand for graphical processing.

Figure 6 - NVIDIA's Automotive Pipeline Sample

Source: NVIDIA's 2023 Q3 Investor Presentation

Figure 7 - Revenues by Geography for 2023



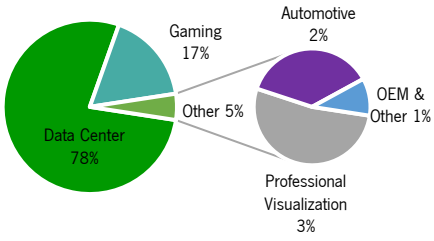
Source: NVIDIA's 2023 Q3 10-K Report

Geographic Span

NVIDIA's customers are not very spread out across the globe, with at least **52%** of sales coming from Southeast Asia. The U.S are the main clients, holding **44%** of sales in the last 12 months. Taiwan (**22%**) and China (**17%**) are the main Asian geographic hot spots of the company (**Figure 7**). It is worth noting that sales are slowly moving to the U.S. following the pandemic. With a new focus on data center equipment, the geographical shift is inevitable as most of Asian clients do not fit into this category. NVIDIA includes a component to sales that refers to "Rest of the World", which makes **17%** of sales, but does not indicate which countries specifically.

The company's supply chain has a similar exposure to Asia with almost **70%** of operations (**Table 3 and 4**).

Figure 8 - Revenues by Report Segment for 2022



Source: NVIDIA's Financial Reports

Company Strategy

Technological Moat | NVIDIA's stands at the forefront of technological development within the markets in which they operate. Taking AI as an example, NVIDIA saw the potential of their technology in the results of projects it aided in developing and decided to invest in said research. It only very recently started to payoff and whether or not it does, belongs to the future.

Innovation Moat | However, this not the first time the company has both feet ahead of the competition. NVIDIA rose from the foresighted vision of a group of people already developing state-of-the-art equipment, which led the company to enter the GPU market, or rather, create it. Later on, NVIDIA caught wind of the involvement of the GPU in the cryptocurrency market and made the proper arrangement for their technology to fit the market, to the point where the mining of cryptocurrency led to an incredible shortage of GPU equipment, causing turmoil in parallel markets where certain mining-focused GPUs sold for more than five times the manufacturer's suggested retail price (MSRP).

Leading Market Share / Brand Recognition | Moreover, the company is already deeply entrenched in the world's market where, at any given point in time, most of the world, unknowingly or not, used NVIDIA's products. Market research seems to agree that NVIDIA holds more than 50% of the global GPU market, regardless of its application. Some market researchers point to market share similar to what Google is for the search engine, making it all the more impressive. With such reputation, NVIDIA can easily fit into new markets and create partnerships with similarly leading companies of their respective industries, without much concern for integration costs, as GPUs can readily be

Table 3 - Supply Chain Exposure

Supply Chain Exposure	
Taiwan	38%
United States	31%
China	15%
South Korea	8%
Thailand	8%

Source: NVIDIA Corporate Responsibility Report

adjusted to fit the needs of the customer. Favoring from their dominance, NVIDIA is also able to charge a premium for their products and services.

Figure 9 - Semiconductor Supply Chain Economics

Source: Boston Consulting Group Report

Figure 10 - Semiconductor Segment Economics

IDMs
Segment economics
(% of annual revenue, 2016-2019)

Gross Margin:	52%
R&D:	14%
Capex:	20%
Operating Cash Flow:	17%

Fabless
Segment economics
(% of annual revenue, 2016-2019)

Gross Margin:	50%
R&D:	20%
Capex:	4%
Operating Cash Flow:	20%

Foundries
Segment economics
(% of annual revenue, 2016-2019)

Gross Margin:	40%
R&D:	9%
Capex:	34%
Operating Cash Flow:	15%

OSATs
Segment economics
(% of annual revenue, 2016-2019)

Gross Margin:	17%
R&D:	4%
Capex:	16%
Operating Cash Flow:	2%

Source: Boston Consulting Group Report

Industry Overview

The semiconductor industry is a vital sector that plays a critical role in powering modern technology. It encompasses the design, manufacturing, and sale of semiconductor devices, which are the building blocks of electronic devices and integrated circuits. It is a continuously expanding market with its growth being driven by factors such as increasing demand for electronic devices, advancements in emerging technologies and the increase of connected devices across industries.

The demand for semiconductors stems from a wide range of industries, including consumer electronics, automotive, telecommunications, industrial, healthcare, and more. The growing adoption of connected cars, smart homes, artificial intelligence, and industrial automation is driving the need for advanced semiconductors.

The industry faces several challenges, including the increasing complexity and cost of semiconductor manufacturing, geopolitical tensions affecting global supply chains, volatile availability of precious metals, and the need to address environmental concerns associated with electronic waste and energy consumption. Additionally, semiconductor companies need to navigate intellectual property issues, heavy regulations, and intense competition.

Despite challenges, the semiconductor industry continues to evolve, driven by technological advancements and the growing demand for electronics. As these drivers push the industry forward, it is set to play a vital role in shaping the future of technology.

Supply Chain Landscape

In the semiconductor business, both capital expenditures and research and development are extremely capital-intensive due to the need for equipment to produce transistors down to the nanometer and the need for intricate design of such complex products as CPUs and GPUs. As such, few are the companies that can afford both, leading to various companies to contribute to the industry in different ways, specializing into one of the following businesses:

Integrated Device Manufacturers (IDMs) | These companies are all-in-one, designing, manufacturing, and selling semiconductors on their own, having their own fabrication facilities (fabs). Such companies are Intel and Samsung.

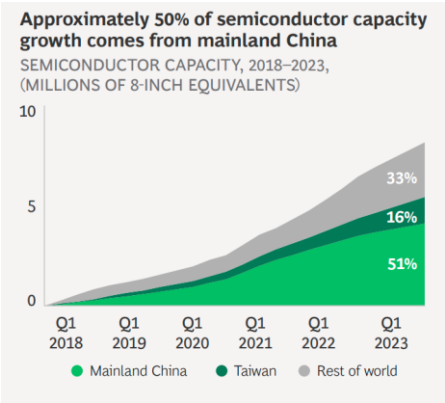
Fabless | NVIDIA is the perfect example of such a company, along with AMD, its main competitor in the dedicated GPU business. Unlike IDMs, these focus solely on semiconductor design, avoiding the capital expenditures related to production and outsourcing the remaining steps in production such as manufacturing, assembly, packaging and testing to other specialized companies, diverting funds to R&D instead.

Foundries | These mainly cater to the manufacturing needs of fabless companies. However, they can also help address some of IDMs' production needs, especially when these companies lack the installed capacity in-house. By serving a broader customer base, foundries spread out the risks associated with the substantial capital investment required to build state-of-the-art fabrication facilities. With such a large increase in semiconductor demand in recent years, foundries became the main production bottleneck in the industry's production line. The primary global supplier is Taiwan Semiconductor Manufacturing Company (TSMC), owning a heavily advanced foundry in Taiwan.

Assembly and Testing (OSATs) | After manufacturing the chips, these need to be tested for defects and assembled onto a casing, which includes the cooling and aesthetics of the CPU/GPU. This step is the one that requires the least amount of complexity in the entire process.

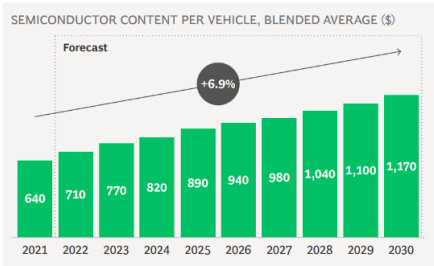
Equipment Suppliers | In any other industry, suppliers of equipment are not as critical as they are for the semiconductor industry. To be able to produce equipment within the nanometric scale, precision is the utmost priority. The number of machines built are always in short supply and creating them requires years of research, thousands of highly skilled workers, and specialized components from different parts of the world. As such,

Figure 11 - Semiconductor Capacity by Geography



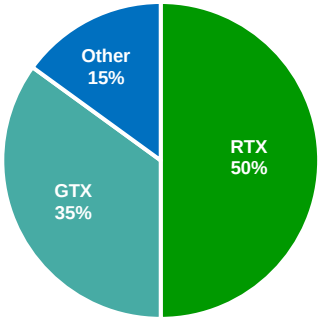
Source: Boston Consulting Group Report

Figure 12 - Semiconductor Content per Vehicle



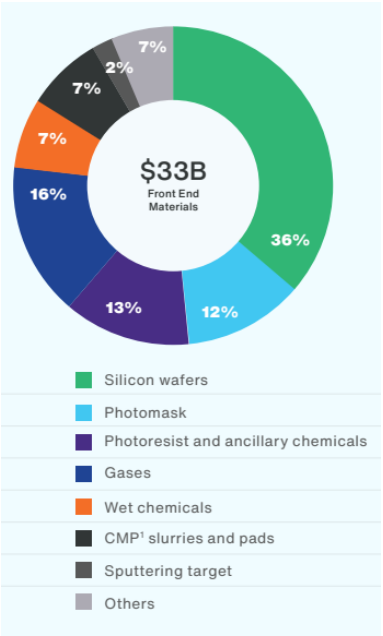
Source: Boston Consulting Group Report

Figure 13 – Share of Gaming GPUs in Top 20



Source: Steam Hardware & Software Survey

Figure 14 – Semiconductor Key Materials



Source: Boston Consulting Group Report

there are only a handful of companies able to deliver state-of-the-art machinery, which prompts exorbitant amounts to acquire such equipment. ASML, a company based in the Netherlands, is the largest supplier of the industry and the only one capable of creating extreme ultraviolet photolithography (EUV) machines, which are at the forefront of semiconductor technology and priced at ~US$ 300 million.

Global Demand

In the future, market growth is expected to be in line with recent years. 2024 will be a crucial year in determining the path of the industry in the long-term. According to McKinsey, about 70% of semiconductor industry growth is predicted to be driven by the automotive, computation and data storage and wireless industries. NVIDIA managed to have exponential growth in a market deemed in downturn, reporting almost a 10% decline in sales for the year, where the company's AI ecosystem gamble in 2015 starting to pay off.

Artificial Intelligence | However, 2024 is predicted to break records by posting global sales of US$ 588 billion, growing 13% YoY. The main demand driver is now generative AI, led by the sudden popularity of ChatGPT, which has an application for every possible industry. With such a growth opportunity, new entrants to the market can be expected, with new architectures and models, all tailored to a specific use-case of the AI creation process. AI chips are expected to reach US$ 50 billion in 2024, reaching US$ 400 billion in sales by 2028. AI, in its entirety, is expected to reach US$ 1 trillion in market size by 2027, with a 18.6% CAGR.

Automotive | With the strongest-growing segment likely to be automotive, with an expected tripling in demand, driven by applications such as autonomous driving, advanced driver assistance systems (ADAS) and infotainment, semiconductor content in vehicles is expected to increase substantially, moving from an average of US$ 640 to US$ 1170 (**Figure 12**) in semiconductors per vehicle, growing at 6.9% YoY. Gartner expects a CAGR of 11% in the auto business, out growing the remaining applications of semiconductors, even data center and industrial (both with 9%). Partnerships between automotive and semiconductor companies are on the rise, with manufacturers trying to secure supply ahead of time, both in ICs and self-driving equipment.

Gaming | The demand for consumer facing GPU equipment surged during the pandemic, both for gaming and workstations. The lockdown introduced a new paradigm to the workplace – remote – pushing companies and individuals investing in equipment powerful enough to handle the workload. The gaming sector is deemed to keep growing, reaching a size of US$ 321 billion by 2026, according to PwC. With the prominence of raytracing, NVIDIA was and will likely be taking advantage of their expertise in professional visualization and applying it to the gaming industry, pushing it forward in terms of visuals and performance (**Figure 13**).

Global Supply

Complexity Problem | As the world becomes increasingly reliant on microchips, present in every industry, the demand for semiconductors has consistently outpaced supply, as foundries have a hard time keeping up with production needs. Adding to the complexity is the highly intricate and capital/resource-intensive process of fabricating semiconductors. Producing these chips requires cutting-edge technology and likewise expertise, whose facilities involve clean rooms and specialized equipment. Expanding the capacity to accommodate with demand requires building new plants, a very costly and time-consuming task. The more advanced the chip is, the more intricate the machine needs to be. That is, NVIDIA's supply problem, also comes from TSMC and other foundries' supply problems of equipment. ASML have a position in their market close to a monopoly. With only one entity supplying equipment, the capital problem is further exacerbated as ASML can easily charge a premium for their technology, and ultimately the innovation problem, as ASML's machines are practically the only way to enable breaking new technological frontiers. NVIDIA's strategy relies on innovation as a value creator, establishing a major investment risk for the company.

Key Metal Shortages | Moreover, as seen in 2021, shortages of key metals such as silicon, gallium, tantalum, and other rare earth metals leverages the strain on the industry, further widening the supply-demand gap. Metal shortages have industry-wide cascading effects by halting upstream operations, where no new products are packaged due to the lack of chips from foundries, but also setting back downstream players, where equipment manufacturers are unable to make new machines for the same reason (**Figure**

14). As every other industry relies on semiconductors, they also suffer from collateral damage, effects apparent on the automotive industry, setting back production of new vehicles for several months.

Moore's/Huang's Law

To understand NVIDIA's point of view on the evolution of computational limits on GPUs, first we must look at its main counterpart, the CPU. Moore's Law, named after Intel co-founder Gordon Moore, predicted that every two years, the number of transistors on an integrated circuit would double, with no change in cost. Rather than a scientific law, it became the main objective of the semiconductor industry. For 60 years, that is, until Intel took 5 years to do so, with the development of the 10-nanometre transistor. NVIDIA thus claims Moore's Law is no longer valid. Instead, the company decided to create Huang's Law, named after the CEO, applying the 2X rule to performance instead, claiming to have managed to follow the rule for the past ten years. As such, NVIDIA's GPU-accelerated computing is, so far, the best bet at trying to meet the exponential growth in computing power established by Huang's Law.

Competitive Positioning

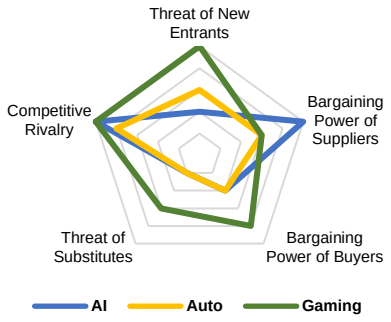
Porter's Five Forces

Table 4 - NVIDIA's Supply Chain Layout

NVIDIA Supply Chain	
Semiconductor Wafers Production	
Company	Location
TSMC	Taiwan
Samsung Electronics	South Korea
Assembly, Testing and Packaging	
Amkor Technology	United States
BYD Auto	China
Hon Hai Precision Industry	Taiwan
King Yuan Electronics	Taiwan
Omni Logistics	United States
Siliconware Precision Ind.	Taiwan
Wistron Corporation	Taiwan
Adapter Card and Switch Systems	
Flex Ltd.	United States
Jabil	United States
Universal Scientific Industrial	China
Networking	
Fabrinet	Thailand

Source: NVIDIA Corporate Responsibility Report

Figure 15 - Porter's Five Forces Radar Graph



Source: Author

Threat of New Entrants: Low to Moderate | The semiconductors sector demands hefty capital investment in R&D, manufacturing infrastructure, in the case of foundries, and intellectual property. NVIDIA and similar companies have created a strong brand reputation, developed patents and new proprietary technologies. Nonetheless, there is still a possibility of entrants in the area of AI, given the recency of the market. Companies who develop AI software have the advantage of being able to tailor hardware to their specifications. With enough investment, competition is possible. Recently, Microsoft announced Azure Maia AI Accelerator, an AI chip designed to handle training and generative AI tasks. Larger companies such as Microsoft, Intel and Apple are the primary threats given that these already have either production infrastructure or research and development capabilities. In Microsoft's case, with the number of Azure cloud data centers they have available, producing their own chips is incredibly attractive, as not only might they be able to create cheaper chips but reduce energy consumption and maintenance costs.

Bargaining Power of Suppliers: High | NVIDIA relies heavily on suppliers for rare earth elements, components and equipment crucial for the manufacturing process of the most advanced chips. The semiconductor industry is specialized in nature, where key suppliers become the main points of failure in the fabless-type supply chain. The smallest of disruptions can have heavy impact on NVIDIA's operations. Despite having the leverage inherent to its dominant position in the market, their reliance on such specialized suppliers gives them great bargaining power. This is mostly the case concerning the data center and auto segment, as gaming GPUs have lower requirements when it comes to manufacturing.

Bargaining Power of Buyers: Low to Moderate | NVIDIA's customers are both individual and business. Individual customers have significantly more buying power, as there is a greater market for gaming and visualization GPUs, allowing choice and less than prohibitive switching costs, even though NVIDIA has most of the market share. Larger-scale clients, however, especially those bound to data centers and AI technology, have less buying power given NVIDIA's technological superiority and relatively limited competition in this segment, allowing the company to dictate terms.

Threat of Substitutes: Low | GPUs thus far have no competitive substitute. CPUs are able to handle some of GPU's capabilities in products where visualization and parallel computing power are not a priority, such as lower-end laptops, with the use of integrated graphics. Their performance is nowhere near that of a dedicated GPU, forcing customers to obtain GPUs if the need for such characteristics arises. Nonetheless, computer science scholars and research labs are already studying new emerging technologies that could, in some way, endanger the specific superiority of GPUs, specifically quantum computing.

Competitive Rivalry: High | The semiconductors sector is a highly competitive one, where companies fight fiercely for market share. There are a limited number of competitors in the industry and, nevertheless, NVIDIA is constantly under the pressure of these companies such as AMD, Intel, Qualcomm, and other companies within NVIDIA's

technological space. To maintain competitiveness, the company needs to stay ahead in terms of performance, efficiency and innovation, which is not an easy task. Large companies in the industry try to differentiate their products in an effort to coexist with competitors, usually with the help of partnerships and enabling features specific to a niche set of customers. Exiting the industry is also a difficult task as most of capital investments and research do not carry over to other products and industries.

Environmental, Social and Governance

Figure 16 - NVIDIA's Sustainable Development Goals

Source: NVIDIA's Corporate Responsibility Report

ESG analysis is becoming increasingly important for investors, particularly as concerns about sustainability and social responsibility become more prominent. With the introduction of the Sustainable Finance Disclosures Regulation (SFDR), the ESG investment landscape has started to change, becoming more transparent and sustainable, bound by a greater and more detailed set of regulations for financial market participants, allowing capital to be channeled towards companies that display efforts in creating a more sustainable economy.

The company has been able to maintain its pristine ESG ranking of previous years (**Figure 21**), according to MSCI, finding itself as an ESG leader of the semiconductors sector. Sustainalytics reports the company to be of low ESG risk (**13.5**), placing **4th** in the Semiconductors sector in a survey of **349** companies of the sector, maintaining similar risk in recent years. Refinitiv however, shows a negative change in combined score, from **A-** to **C+** in 2022, given that they include controversies in the score with a greater weight, rightly so. Controversies aside, ESG scores are in line with other ESG data providers. When compared to its peers, NVIDIA manages to deliver better ESG results across the board. This performance is expected to continue in the near future if the company continues to enforce their current policies.

Environmental

Policies and Measures | NVIDIA, as mentioned previously, does not manufacture and package their own equipment, outsourcing most of their operations to a set of companies, mostly located in Southeast Asia. This means that the company can only control environmental concerns by forcing suppliers to adhere to a set of rules defined by the company to ensure higher standards of behavior and create products in a socially and environmentally conscious manner. Such rules include annual reporting of energy and water usage, greenhouse gas emissions and future objectives; third party emissions verification; use of recycled material for packaging; annual risk assessment; review of corrective action plans and, one that can be considered the most important: precious mineral responsible sourcing policy, ensuring that the minerals are sourced from conflict-free zones and that the smelting and refinery equipment is compliant with NVIDIA's requirements.

Figure 17 - MSCI Implied Temperature Rise

Source: Morgan Stanley Capital International

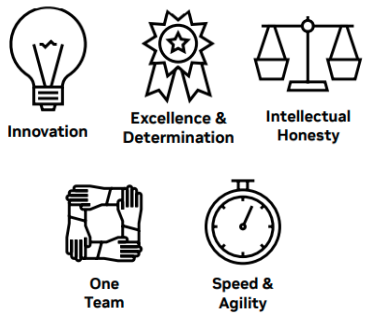
Indirect Commitment | On their own, NVIDIA's commitment to the environment is indirect in its majority. With the rise of AI technology, it is expected that energy consumption will increase accordingly to keep up with computing requirements, creating the need for more efficient data centers. By enabling more efficient accelerated computing equipment and providing the software for AI development, NVIDIA allows customers to achieve greater computing power using much less energy. According to NVIDIA, if the 500 most "green" supercomputers used their equipment, the total energy used would decrease up to 90%. Besides efficiency, by providing the tools for AI development, NVIDIA enables increasing development of different areas of environmental concern, such as drug discovery, DNA/RNA sequencing, medical imaging, self-driving vehicles, weather forecasting and climate modelling, and a wide range of other industries. Additionally, with the development of the cuLitho software, NVIDIA creates environmental impact in downstream operations, helping semiconductor plants multiply their output with minimal energy expense.

Emissions | Concerning GHG emissions, NVIDIA has 2 main goals. For Scope 1 and Scope 2 emissions, the company plans to achieve 100% renewable energy consumption for offices and data centers by end of 2024. So far, only 44% of energy used is renewable, which makes this target highly ambitions. For Scope 3, more specifically regarding their indirect emissions from their outsourced operations, NVIDIA currently emits 1.75 million metric tons of CO_2, which represents 75.5% of total emissions. To reduce this impact, by 2026, the company intends to make, at least, 67% of suppliers adopt science-based targets so as to align with the Paris Agreement temperature rise target of 1.5°C, target which the company stands above by 0.7°C (**Figure 17**).

Social

For a company with around 26 thousand employees across 35 countries, with 7 thousand more than 2 years ago, the S in ESG is of great concern of such a rapidly expanding company.

Figure 18 - NVIDIA's Core Values

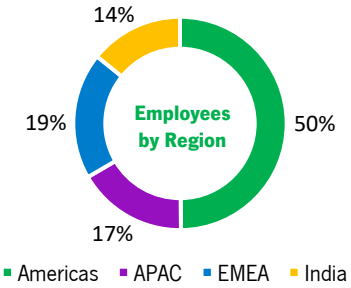


Source: NVIDIA's Corporate Responsibility Report

Hiring | NVIDIA outlines the importance of its employees and recognizes their role in creating long-term value. The company employs various strategies to attract talent, including partnerships with universities for summer internships with the Ignite program, industry conferences and internal referrals, the latter responsible for a third of hires. Employees are hired globally and are offered flexibility to work from locations of their choice and special efforts are made to assist women, minorities, army veterans and disabled to provide equal footing and foster diversity in the hiring process.

Diversity | The company boasts a relatively diverse mix of employees across different dimensions, except for gender, where 80% of employees are male. Despite the aforementioned efforts, the company shows barely any change in the past 2 years, across all dimensions of the workforce. The middle-aged (31-50 years) comprise almost 63% of the workforce, with an apparent shift towards a younger workforce. Geographically, half of employees live in the Americas and 30% in Asia (**Figure 19**). Nonetheless, 50% of employees are Asian and becoming an increasing majority of the workforce.

Figure 19 - NVIDIA's Geographical Distribution of Employees



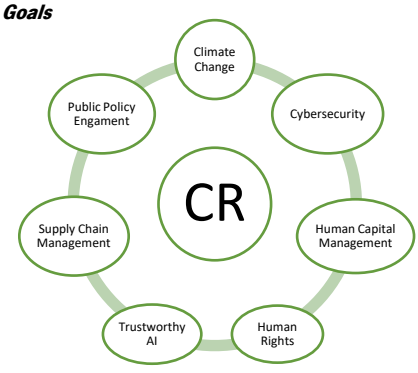
Source: NVIDIA's Corporate Responsibility Report

Philanthropy | With Inspire 365, NVIDIA allows employees to get involved with their communities through volunteering. In 2022, 37% of employees participated in the initiative, with 28865 hours of volunteer hours, to improve education and environment in their communities, valued at almost $2.5 million, along with $22.5 million in charitable donations for nonprofits and humanitarian aid across the world. NVIDIA also shows support for startup companies with the Inception Program, focused on companies with advances in the field of AI and data science. As of late 2021, the program included over 8500 companies in 90 countries, raising over $60 billion in funding.

Equality | Women are less than 20% of the workforce, and even less take part in a leadership, management or technical role, and new hires show the same trend continuing. Only executive roles show greater female representation, with 40% of executive officers and 25% of outside directors. These factors too show almost no evolution in recent years. On the other hand, gender and ethnicity pay ratios show convergence to 100% in significant changes thus far.

Governance

Figure 20 - NVIDIA's Corporate Responsibility Goals



Source: NVIDIA's Corporate Responsibility Report

Committees | NVIDIA follows the Listing Standards of The Nasdaq Global Select Market, a group of companies held to higher standard with a more intricate set of rules pertaining to corporate governance requirements (**Figure 20**), such as majority of independent directors, an audit and compensation committee consisting solely of independent directors, board diversity, and other rules, all of which NVIDIA finds itself in accordance with. Besides the Board of Directors, NVIDIA has 3 main committees: the Audit Committee (AC), responsible for overseeing accounting, financial reporting, operations and strategy; the Compensation Committee (CC), responsible for reviewing, approving and disclosing board member compensation; and the Nominating and Corporate Governance Committee, responsible for selecting candidates for directorship and oversees corporate governance rules and regulation compliance.

Board of Directors | The Board, composed of 17 members with a wide range of professional and educational backgrounds in different areas of expertise, integrates 60% independent board members with a 47% female representation (**Appendix U**). The CEO is not a part of the board, effectively diminishing agency problems. There is no term of office as the company believes that limiting directorship tenure is not in its best interests, claiming that longer-serving directors have valuable insight about the company's operations.

Compensation | The Compensation Committee oversees the compensation of executive officers (**Appendix V**). While non-executive directors are paid only a fixed amount, executive directors and especially the CEO's remuneration is split into base salary, variable cash, and equity components. Both variable cash and equity are awarded based on targets for specific financial KPIs. Variable cash depends on annual revenue. Equity comprises of Single-Year Performance Stock Units (SY PSUs) based on operating income performance, vesting over 4 years, and Multi-Year Performance Stock Units (MY PSUs) based on 3-year total shareholder return relative to the S&P500, vesting over 3 years.

Executive Officers, except for the CEO, are also awarded with Restricted Stock Units (RSUs) vesting over 4 years. If a minimum threshold goal is not met for each, nor the variable component nor SY PSUs are eligible to vest. The company is quite transparent with remuneration and its policies, which I consider as a very positive factor.

Shareholder Structure | Of the total 2.37 billion shares, almost 96% is free-float and each share carries one voting right. NVIDIA's reputation and brand prestige are reinforced by enjoying a diversified base of institutional shareholders, which represent 68.75% ownership, with Vanguard being the largest institutional shareholders with 8.11% ownership. With no majority ownership by a single entity, minority shareholders are not constraint in any way, which allows them to influence decisions and strengthen the company's decision-making. Such a diverse ownership profile means NVIDIA has barely any risk of being compromised by price attacks and other types of corporate takeover strategies and destabilization attempts. Recent insider trading shows a net positive exposure to the company, both from members of the board, executive officers, and institutional holders, pointing to confidence and a strong outlook for the company's future. Dividends are paid out at a consistent $400 million annually with regular stock buybacks, which the company plans on maintaining.

Controversies | One of the main setbacks for ESG scores are controversies, wherein a simple misstep from the company turns, using last year's score as an example, from an exemplar 75.3 to a mere 46 (out of 100). A company of such size is, inevitably, under the thorough watch of the public eye. In the past, NVIDIA faced multiple lawsuits over the Maxwell architecture for false advertising. With the GTX 970 GPU, which were marketed as featuring 4 GB VRAM of memory, barely could achieve more than 3.5 GB. Later on, NVIDIA claimed that same architecture as fully compliant with DirectX 12, one of the main interfaces used for programming games and other multimedia. However, for one the requirements, asynchronous compute, the equipment showed significantly lower performance, with the company pressuring companies to hide the relevant benchmarks. More recently, NVIDIA continues facing controversies, with failure to disclose the impact of crypto mining on the sales of their gaming equipment, raising a settlement fine of US$ 5.5 million, manipulating marketing by blocking tech influencers from receiving new products for focusing on the wrong characteristics and, most recently, suspicions of anti-competitive practices following the now scrapped Arm acquisition and raids on offices by French police. Given the impact of such controversies on the company, these become an apparent investment risk.

Figure 21 - NVIDIA's Yearly ESG Scores

NVIDIA Yearly ESG Score Grades	2022	2021	2020
ESG Score	A-	A-	A-
ESG Controversies Score	D+	B+	D+
ESG Combined Score	C+	A-	B-
Environmental Score	B+	B+	B+
Social Score	B+	A-	A-
Governance Score	A	A-	A-

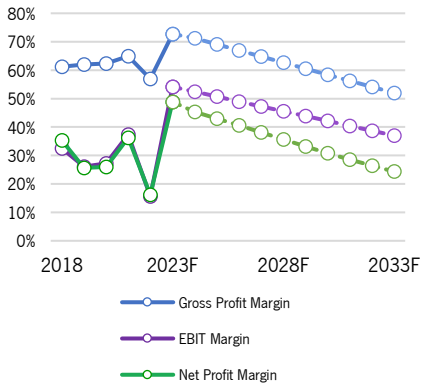
Source: Refinitiv

Financial Analysis

Profitability

Gross Profit | In the historical period, NVIDIA's Gross Profit margin remained stable, slightly shifting between 60% and 65%. Only in 2023 did the margin jump to 73% (from 57% in 2022), indicative of a shift in the business mix. In the forecasted period, the gross profit margin slowly moves towards 52% in 2033YE (**Figure 22**). As of now, NVIDIA can charge a premium for their servers given its dominance over similar products, yielding a greater margin which I expect to decrease, as this premium fades, with competition catching up with NVIDIA.

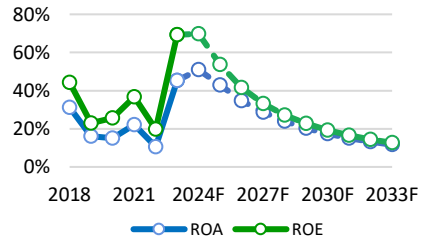
Figure 22 - Profit Margin Estimates



Source: Author Estimates

EBITDA, EBIT and Net Income Margin | Given that NVIDIA is a fabless company, all three of these ratios are closely tied. The company's main non-operating costs come from research and development and compensation, with barely any interest expenses from the low levels of debt. EBIT/EBITDA Margin has been erratic in the historical period, posting a low of 16% in 2022 and a high of 54% in 2023 (**Figure 22**), fruit of the company's changes in its core business. This low can also be explained by an unusual expense of US$ 1.35 billion, pertaining to acquisition termination costs arising from the failed acquisition of Arm. Until now, NVIDIA had difficulties stabilizing efficiency, possibly trying to maintain their share of the GPU market. In the forecasted period, and as a part of the assumptions of the valuation model, EBIT margin converges to 37% in 2033YE, with Net Income margin decreasing 13% below EBIT over the period. This decrease comes from the assumption related to taxes, where, as of now they are effectively 12%, increasing towards the marginal U.S. tax rate of 25% during the period, slowly moving EBIT and NI margin apart.

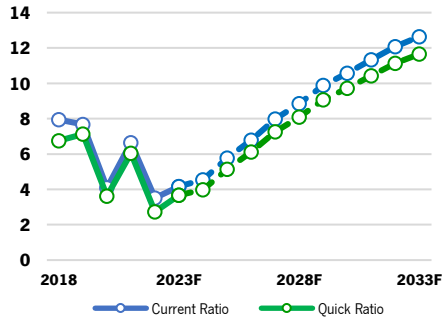
Figure 23 - Return on Assets and Equity Estimates



Source: Author Estimates

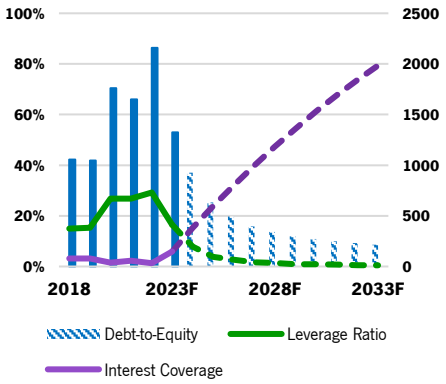
Returns | NVIDIA has, in the past 5 years, greatly reduced returns across the board, with Return on Equity falling from 44% to 20%, Return on Assets falling from 31% to 11% and Return on Capital falling from 94% to 19% (**Figure 23**). With the data center business providing a great influx of cash flows and greater margins, 2023 shows 3 to 4

Figure 24 - Liquidity Ratios



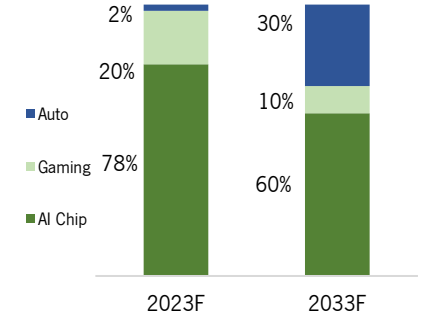
Source: Author Estimates

Figure 25 - Solvency Ratios



Source: Author Estimates

Figure 26 - Revenues by Grouped Business Segment



Source: Author Estimates

times greater returns, with ROA and ROC further increasing in 2024YE. From then on, ROE and ROA converge to a stable rate, while ROC maintains 55% in 2033YE.

Liquidity

For semiconductor companies akin to NVIDIA, liquidity is seldom a concern for fabless-type industries as the requirements for heavy capital investments are much lower, with no necessity to raise large amounts of debt. Given the gross profit margin on their products and low levels of debt, the company has had their current ratio above 6x, with quick ratio closely behind given their almost negligible inventory. However, 2020 and 2022 tell a different story, where liquidity was diminished by the acquisition of Mellanox for US$ 7 billion in 2020, and the botched acquisition of Arm, which cost US$ 1.35 billion, which forced the company to reinforce their cash position by raising debt. The current and quick ratio then start to create a greater gap, following the integration of Mellanox's inventory. In the future, liquidity is expected to take 5 years to recover to previous levels and continue improving from then on (**Figure 24**).

Solvency

Concerning NVIDIA's solvency figures (**Figure 25**), the Debt-to-Equity ratio, reached a maximum 86% in 2022, almost doubling that of 2018. With the vast amounts of cash forecasted to enter the company in the following years, reducing the need for debt, Debt-to-Equity decreases from 53% (2023YE) to 9% (2033YE), and long-term debt converges, practically, to 0%. Following the forecasted growth in revenues, total assets grow from US$ 65 billion in 2023 to US$ 2.08 trillion. Over the historical and forecasted period, Net Debt-to-Equity is almost always negative, showing that cash can cover all debt and liabilities, indicative of a strong solvency position.

Valuation

Valuation Methods

A valuation of such a company as NVIDIA would be greatly favoured by a Sum-of-the-Parts approach, valuating the different business segments separately. However, this approach, despite being considered, was found to be detrimental to the valuation as the company does not supply separate financial statements, nor disclose margins related to each of the segments. Moreover, given how recent the artificial intelligence market is, detailed information is scarce and, as such, the chances of this information being accurate are faint. Trying to forecast such information would have introduced a fair share of extra assumptions that would make the model overly complex and less reliable. Instead, the company was valued as a whole, with two approaches: an intrinsic valuation, based off NVIDIA's financial statements, and a relative valuation, comparing the company to a specific range of similar companies of the semiconductors sector.

Intrinsic Valuation

For the intrinsic valuation, a Discounted Cash Flow Valuation was used with a Three-Stage Free Cash Flow to Firm (FCFF) Model, with a 5-year high-growth stage spanning from 2023 to 2028, a 5-year declining growth stage spanning from 2028 to 2033, and the stable-period stage, from 2033 towards perpetuity. This approach was deemed appropriate because it reflects the different stages of growth that a company goes through when such a breakthrough technology abruptly impacts its financials, making NVIDIA similarly fit for this model as a startup company is. This approach led to a price target of **$739** per share, leading to a **BUY** recommendation for NVIDIA, with an upside of **20.1%**.

(All assumptions are available on **Appendix F**)

Revenue Forecasts

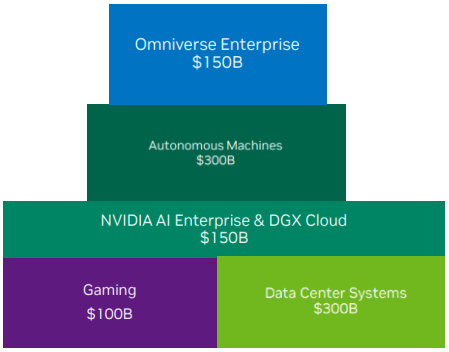
To simplify the revenue distribution, three segments were established: Gaming, in which I decided to include the Gaming and Professional Visualization segments established by the company as the equipment sold in each of the segments is now essentially the same. Data Center; Auto, including the segments Auto and OEM & Other (**Figure 26**). Obtaining market research information for the gaming and auto sector was simple, but for AI, that was not the case. As the AI market is still in its infancy, market analysis showed lack of consensus, with great disparity from one report to another. With this in mind, a top-down approach using market size and market share was not possible for, what is now the largest segment for NVIDIA. Instead, what NVIDIA calls a *'$1 Trillion Long-Term Available*

Market Opportunity' was used as baseline for the revenues levels of 2033, increasing linearly during the valuation timeframe. Information and estimates provided by the company itself were used with the intention of creating a more trustworthy target price.

$1 Trillion Opportunity Explained |** The company intends to provide products or services for every step of the artificial intelligence integration into the market. Initially, NVIDIA is set to address consumer needs, foreseeing a US$ 100 billion opportunity in the gaming market and US$ 300 billion in data center systems for cloud service providers. Transitioning into the Enterprise market, NVIDIA introduces NVIDIA AI Enterprise and DGX Cloud, serving as platforms for AI creation and High-Performance Computing, respectively, unlocking a US$ 150 billion opportunity. In the automotive segment, NVIDIA plans to supply AI equipment to auto and robotics manufacturers for autonomous machinery, which represents a US$ 300 billion opportunity. Lastly, delving into industrial digitalization, NVIDIA presents Omniverse Enterprise, offering a US$ 150 billion opportunity to create digital simulated replicas of real-world industrial operations (Figure 27 and Appendix G**).

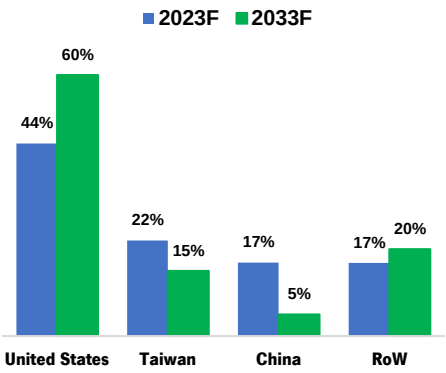
Forecasted Geographical Revenue Distribution | The current distribution of revenues shows that most of the revenue is undispersed, with almost half coming from the U.S. and half from Southeast Asia. Thus far, NVIDIA's clients were mostly computer manufacturers, who used NVIDIA's GPUs in their products. These revenues refer to these clients, not the location of the final customer. With the new AI servers, this distribution is expected to change as the service will be directly sold to the corporate client. Moreover, with the current feud between the U.S. and China, and the subsequent technological blockading by the U.S. Senate, a shift from Asia, and particularly China, to the rest of the world, I believe, is expected to happen. As such, the U.S. is expected to have 44% of revenues initially, moving to 60% over time. China, with 17% of revenues, is expected to only have 5% of revenues in the terminal year, mostly from the gaming segment. Given Taiwan's number of companies using NVIDIA's equipment, their share is expected to reduce slightly, favoring the 'Rest of the World' category, particularly Europe, as being a major client of the Data Center segment (**Figure 28**).

Figure 27 - NVIDIA's $1 Trillion Opportunity



Source: NVIDIA's Q3 Investor Presentation

Figure 28 - Revenue by Region



Source: Author Estimates

Main Valuation Inputs

Market Values of Equity and Debt | The market values of equity and debt were estimated to use as value weights for the WACC formula. For equity, the closing price per share for January 31st 2024 of **US$ 615** was obtained and the total market capitalization was computed using the number of shares outstanding. As for debt, NVIDIA provides a detailed list of issued corporate bonds, for which the current price was obtained using Refinitiv Eikon and used to estimate the current market value (**Table 5 and Appendix J**).

Table 5 - Market Values of Equity and Debt

Bond Rating	A1/A+
Marginal Tax Rate	25%
Effective Tax Rate	12%
Shares Outstanding	2,494
Share Price (as of 31/1/2024)	615
Market Value of Equity	**1,534,483**
Market Value of Straight Debt	8,316
Market Value of Op. Leases	1,119
Total Market Value of Debt	**9,435**
Total Market Value	**1,543,918**

Source: Author Estimates

Leases and R&D Capitalization | Operating leases must be capitalized using the company's lease commitments for the following years. However, NVIDIA already capitalizes leases, using the present value of the remaining payments discounted to their internal cost of debt. Research and Development expenses should also be capitalized. In 2022, the 2017 Tax Cuts and Jobs Act required NVIDIA and other taxpayers to capitalize and amortize R&D expenditures, meaning that these expenditures are already accounted for in the balance sheet and reflected in the value of equity, requiring no further adjustments to financial statements.

Cost of Debt | The cost of debt was initially obtained by adding the risk-free rate, which I considered to be the one of the currency used in the valuation, the 10-year US government bond yield of **4%**, to the default risk spread for the U.S. and the default risk spread for the company. The latter, was obtained by using the rating of a corporate bond, considered A+ by S&P Global, and attributed a spread following Damodaran's synthetic rating methodology, arriving at a company risk spread of **1.2%**. This cost of debt changes with time, adapting the company's spread to its interest coverage ratio, using the same methodology, and the tax rate, which changes from the effective tax rate of **12%** to **25%**. The cost of debt decreases from **4.6%** to **3.5%** over the estimation period (**Table 6 and Appendix J**).

Table 6 - Cost of Debt Estimation

Cost of Debt	2023	2033F
Risk-Free Rate	4.0%	4.0%
Interest Coverage Ratio	148	1985
Synthetic Rating	A+	AAA
Spread	1.2%	0.7%
Pre-Tax Cost of Debt	**4.7%**	**4.7%**
Tax Rate	12%	25.0%
After-Tax Cost of Debt	**4.6%**	**3.5%**

Source: Author Estimates

Beta | The measure of specific risk, beta, also varies throughout the valuation time span. Initially, the beta is calculated using a regression featuring 5 years of monthly returns, benchmarked against the S&P 500 index. **Appendix I** shows that for the 5-year rolling window, the beta is still below pre-Covid levels and, as such, a pre-Covid beta was selected, yielding a value of **2.05**. This beta is reduced linearly until 2033, towards the levered semiconductors sector beta of **1.44**, calculated using Damodaran's data, obtained using 68 companies of the sector in the US, adjusting for the company's cash,

Table 7 - WACC Estimation

WACC	2023	2033F
After-Tax Cost of Debt	**4.6%**	**3.5%**
Weighted Average ERP	**6.3%**	**6.1%**
Debt/Equity	0.6%	0.6%
Levered Beta	2.05	1.44
Cost of Equity	**16.9%**	**12.9%**
WACC	**16.86%**	**12.79%**

Source: Author Estimates

Table 8 - FCFF Valuation Results

FCFF Valuation	
(In millions of US$)	
Sum of Projected FCFF	916,903
PV of Terminal Value	918,988
Total Enterprise Value (TEV)	**1,835,891**
Minus: Total Debt	9,435
Plus: Cash	25,984
Equity Value	**1,852,440**
Diluted Shares Outstanding	2,507
Implied Share Price	**739**

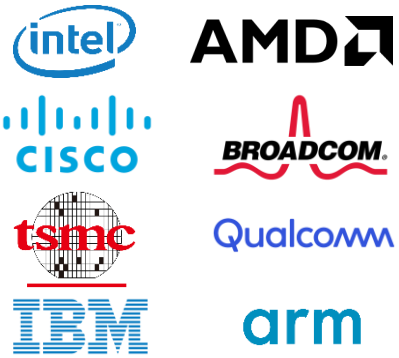
Source: Author Estimates

Table 9 - FCFF Terminal Value Estimation

Terminal Year – FCFF Valuation	
(In millions of US$)	
Growth Rate	2.5%
EBIT	400,482
EBIT(1-t)	300,362
Reinvestment Rate	21.03%
Reinvestment	63,152
FCFF	237,210
Terminal Value in Final Year	**2,526,077**

Source: Author Estimates

Figure 29 - Relative Valuation Peers



Source: Author Estimates

Table 10 - Relative Valuation Results

Relative Valuation	
Metrics	**Median Price**
EV/Sales	415.09
EV/EBITDA	652.43
EV/EBIT	630.99
P/E	487.14
P/OCF	374.68

Source: Refinitiv

as cash has a beta of 0, and levering using the company's marginal tax rate of **25%** in 2033 and its debt-to-equity ratio, calculated using market values (**Table 7**). In the terminal period, the beta used for 2033 is adjusted to reflect the fact that all betas tend to 1, by using the same methodology as Bloomberg uses for adjusted betas: **two thirds sector beta, one third market beta**. The terminal beta stands at **1.30** (**Appendix I**).

Cost of Equity | The cost of equity is calculated through the CAPM formula, using a revenue-weighted average of the Equity Risk Premiums of the countries where NVIDIA's clients are located, the risk-free rate and a levered beta, explained previously. NVIDIA includes a '*Rest of the World*' region without detailing the countries included. To solve this problem, a World Equity Risk Premium was calculated with a GDP-weighted average using Damodaran's data. Then, removing the weights for the countries for which the ERP were already obtained, effectively arriving at an Adjusted World ERP of **10.4%**. The cost of equity moves from **16.9%** to **11.9%** in the terminal year (**Appendix H**).

WACC | The Weighted-Average Cost of Capital stands at **16.86%** and is predicted to decrease to **12.79%** in 2033 and to **11.89%** in perpetuity. Given the risky nature of the technology business, and the lack of issued debt, forfeiting the benefit of tax shields, this cost is expectedly higher (**Appendix J**).

Free Cash Flow to Firm (FCFF)

Terminal Value | For the terminal growth rate, the risk-free rate was deemed appropriate, but not at the levels used throughout the 10 year valuation window. Instead a value slightly above the central bank inflation target of 2% (**2.5%**) as used, yielding a terminal value of **US$ 2.526 trillion**. After discounting to the WACC rate, the present value of terminal value is **US$ 918 billion** (**Appendix R**).

As the target price is for the end of 2024, the first cash flow would be in the end of 2025, which I consider to be the first year in the discounting process. After obtaining the present value of both the cash flows and the terminal value, an Enterprise Value (EV) of **US$ 1.835 trillion** was obtained, adding the current cash amount and removing the total debt, arriving at an Equity Value of **US$ 1.852 trillion**. With 2.5 billion dilution-adjusted shares outstanding, the Implied Share Target Price is **US$ 739** per share.

Relative Valuation

NVIDIA are setting a new precedent. It is a very singular company in the semiconductor business, with the majority of revenues coming from a market which only very recently became apparent, pushing revenue growth to the level of a startup. Outlook on such a market is erratic across market research. As such, selecting peers becomes a difficult task. The deciding factor was similar companies in terms of products and business segments, not risk nor size. If the selection were focused on any single factor, the number of peers would be very limiting for comparison.

The companies used as peers are: **Intel**, **AMD**, **Broadcom** and **Qualcomm**, for their similarity to NVIDIA on chipsets; **Cisco** and **IBM**, for their presence in cloud computing; **TSMC**, for its encroachment in NVIDIA's business; and **Arm**, for the research and development approach. Overall, these peers are, or are starting to be involved in the AI business (**Figure 29**).

Selecting by similar size would not enable comparison due to NVIDIA having a much larger market capitalization than any of the other peers. By selecting by risk, I would be ignoring the fact that most of these peers will start to enter the AI market, raising risk to similar levels between peers.

For the valuation, forward looking 1-year ratios were used. NVIDIA has just started in the AI business, but I see it becoming the company's core business in the future. As such, this choice comes from the fact that selecting historical or current ratios would be in similar fashion to using a completely different company for the comparison. With the forecasts made for the next year, some of the AI business will be captured by the relevant ratios, which I deem properly befitting for this valuation. In order to dampen the effect of outliers and lack of peers on the valuation, instead of using the average, the median value for each multiple was used (**Appendix S**).

The selected multiples for this valuation were the following:

> **Enterprise Value Multiples** – EV/Sales, EV/EBITDA, EV/EBIT
> **Price Multiples** – Price/Earnings, Price/Operating Cash Flow

Ultimately, the multiple used to obtain a target price was EV/EBITDA. As EBITDA does not capture the depreciation from the peers with foundries and is one of the only multiples where the value does not vary as much in between peers, it was deemed the most appropriate. As a result, the relative valuation yields a target price of **$652.43**, **13.2%** below the target price set by the discounted cash-flow valuation. This difference is explained by how unique NVIDIA is, making it difficult to obtain an accurate comparison.

Investment Risks

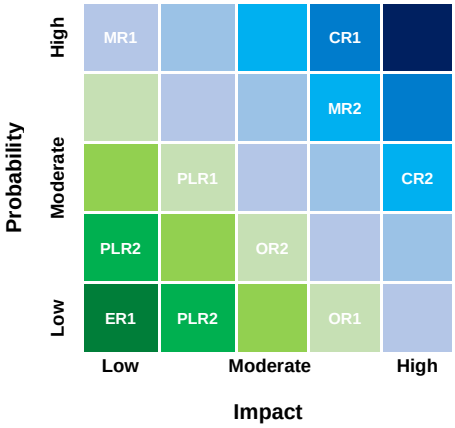
Corporate Risk | Market Need for Innovation and Competition (CR1)

Probability: HIGH | Impact: MODERATE

Failing to keep up with the changing needs of the semiconductor industry and markets poses a big risk for NVIDIA. The semiconductors sector is always changing, with new technologies, customer demands, and competitors popping up all the time. Staying ahead of the competition means being quick to adapt strategies and develop products that meet the latest industry standards and customer expectations of innovation, investing in research and development, launching new products, and expanding reach to stay competitive.

Apart from new technologies, NVIDIA must also navigate through new markets where they are inexperienced. Getting customers on board with new products can be a long and uncertain process, and even then, it doesn't always translate into revenue. The timing and success of these ventures can greatly impact revenue and expenses, allocating a lot of resources into new ideas, but there's no guarantee they'll pay off.

Figure 30 - Risk Matrix



Source: Author Estimates

Corporate Risk | Stock Price Volatility (CR2)

Probability: MODERATE | Impact: HIGH

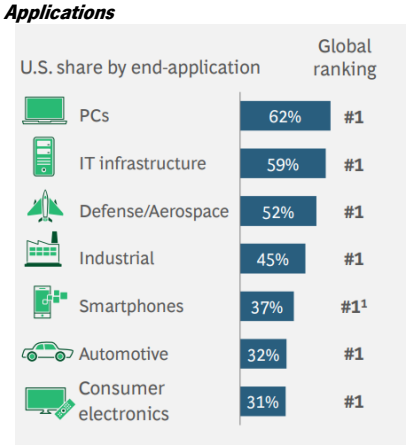
NVIDIA faces great market volatility risk due its operations in the semiconductor industry, a sector which is characterized by cyclical trends and technological shifts, leading to higher level of risk. The company is also the 5th largest in the S&P 500 Index, with a market capitalization of US$ 1.534 trillion (as of January 31st). Despite its size in the market, its stock price is uncharacteristically volatile, moving 28% in just minutes after the bell, following a surprise in earnings for Q2 in May 2023. Behavioural finance also plays a role in this volatility, with experts claiming there to be a bubble, comparing the current bull market on semiconductors and AI to the breakout of internet related companies in the Dot-com bubble of the late 90s.

Market Risk | Geopolitical Environment (MR1)

Probability: LOW | Impact: HIGH

Geopolitical shifts, along with other uncontrollable events, have the potential to increase global economic instability. Global geopolitical tensions and conflicts, notably in regions like China, Hong Kong, Israel, Korea, and Taiwan, where product manufacturing and assembly are concentrated, may lead to evolving regulatory landscapes and disruptions impacting operations, which could harm revenue, increase expenses, needing significant resources and time to resume normal operations. Recently, the U.S. and China are under what can be considered a Cold War of sorts, with a focus on technology and Taiwan's strategic position in this market. Seeing the potential benefit of controlling the semiconductors market and its importance to artificial intelligence (**Figure 31**), the U.S. Senate began imposing commercial restrictions on such technologies for China and pushing Taiwan to do the same, possibly in exchange for protection, harming NVIDIA's stock price momentarily. These policies, however, do not appear to be as momentary, as the Democratic Party has done with AI technology what the Republican Party did to Huawei and export tariffs to China, under Trump's administration. Moreover, tensions are apparent as both countries have run military tests along the island of Taiwan. It is important to note that, as of now, these three countries represent 82% of revenues, making this political face-off a major risk factor guiding NVIDIA's future.

Figure 31 - U.S. Share on Semiconductor Applications



Source: Boston Consulting Group Report

Market Risk | Reliance on Limited Partnerships and Customers (MR2)

Probability: MODERATE| Impact: MODERATE

A significant portion of NVIDIA's revenue relies on a select group of partners and distributors, with a concentration of sales among customers who purchase their products directly or indirectly. The potential loss of these partners and customers poses a

considerable risk to their revenue streams. For instance, in 2023, sales to one single customer represented 13% of their total revenue in the Data Center segment. Their operating results are contingent upon sales within their partners and their ability to integrate NVIDIA equipment into their own products. In the future, partners and customers may decide to decrease their product purchases, develop their own solutions, purchase products from competitors, or discontinue sales, which could alter their purchasing patterns. Moreover, most of their sales are conducted on a purchase order basis, allowing customers to cancel or modify purchase commitments with minimal notice and without penalty, making this risk unpredictable at times.

Operational Risk | Supply Chain Complexity and Vulnerability (OR1)

Probability: LOW | Impact: MODERATE

NVIDIA's manufacturing operations rely heavily on complex and clustered supply chains. One of the main concerns of fabless manufacturing lies in relying on third party entities and their technology to perform most of the tasks related to the manufacturing of a GPU. This, in part, leaves NVIDIA with little to no control over their supply chain's production scale, quality control and timeline, creating a major risk of a negative impact to the company's operations (See global supply and supply chain landscape sections for more detailed information).

Operational Risk | Cybersecurity Threats (OR2)

Probability: LOW | Impact: MODERATE

Given NVIDIA's intangible asset nature and considering how valuable their intellectual property is to the company and other unknown parties, the company is under heightened threat risk. They possess confidential, sensitive, personal, and proprietary information, including data from partners and customers. Security breaches, along with reported or perceived vulnerabilities, or unauthorized disclosure of sensitive data, could expose them to potential risks such as litigation, regulatory inquiries or actions, damage to their brand and reputation, and financial impacts to their business.

Political, Legal, and Regulatory Risk | Antitrust and Competition Law (PLR1)

Probability: MODERATE | Impact: LOW

NVIDIA is subject to antitrust laws and regulations which promote fair competition and prevent the establishment of monopolies. Regulatory investigations, antitrust lawsuits and anti-competitive behavior can lead to financial penalties and reputational damage for NVIDIA. One example of this risk is the termination of the acquisition of Arm, as European regulators halted the deal to investigate possible future monopolistic practices. This led to NVIDIA backing off from the deal and incurring hefty termination costs.

Political, Legal and Regulatory Risk | Export Controls Compliance (PLR2)

Probability: LOW | Impact: LOW

NVIDIA's operations are a subject of export controls, trade sanctions and import regulations imposed by various countries. Compliance with such regulations leads to greater operational costs, regarding tariffs and extraordinary procedures regarding safety compliance and other product related policies, or reduced revenues, as stricter policies blockading or banning exports to certain countries affects the company's cash flows. Non-compliance is also detrimental to the company, resulting in legal penalties and reputational harm for NVIDIA.

Environmental Risk | Susceptibility to Geological Events (ER1)

Probability: LOW | Impact: LOW

The production of semiconductors is a microscopic endeavor, with extremely precise equipment working on the nanometric scale. As such, the slightest interference with these processes can easily deem batches of semiconductors completely unusable. Southeast Asia stands on the so called 'Pacific Ring of Fire', a region of heightened risk of earthquakes and tsunamis. These events are usually of large scale in this region and capable of damaging or even destroying equipment. Given the time it takes to repair or build new equipment this complex, it can lead to a supply setback, interfering with NVIDIA's supply and revenues.

Sensitivity and Scenario Analysis

Table 11 - EBIT Margin Sensitivity Analysis

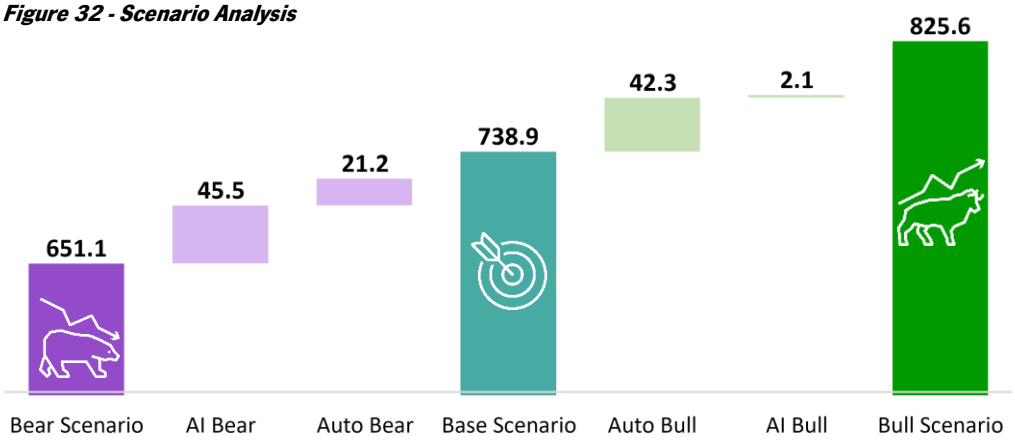
	Difference	Target Price
EBIT Margin (Terminal)	+10%	$ 936.5
	+5%	$ 837.7
	Base (37%)	**$ 738.9**
	-5%	$ 640.1
	-10%	$ 541.4

Source: Author Estimates

EBIT Margin Sensitivity | As one of the most impactful assumptions in the valuation, EBIT margin is a great indicator of operational efficiency. In this sensitivity analysis, starting from the base case of 37%, the drastic fluctuation of the target price can be observed (Table 11).

Revenue Scenario Analysis | To measure the effect of changes in revenues on the target price of the valuation, three scenarios were established: an optimistic or bull scenario, with an increase of 10% from base case in the AI market and 20% in auto market. This difference in percentages comes from considering that the auto market potential is being underestimated by the company when comparing with their estimations for the AI market. This bull scenario encompasses, for the Auto Market, an expectation that NVIDIA will be able to penetrate the automated robotics and industrial vehicles market, and for the AI Market, an unexpected increase in revenues from a new application for AI, innovation in the AI hardware, or a larger AI cloud computing customer base. Below is a graph showing the scenario analysis:

Figure 32 - Scenario Analysis



Source: Author Estimates

FCFF Sensitivity Analysis | In the following tables show the sensitivity of the target price using the FCFF model by changing the WACC and growth rate for the terminal year and EBIT Margin. As expected, an increase in WACC and decrease in growth rate/EBIT Margin makes the target price drop, and vice-versa.

Table 12 - FCFF Sensitivity to WACC and Terminal Growth Rate

Termina WACC \ Terminal Growth Rate	1.8%	2.0%	2.3%	2.5%	2.8%	3.0%	3.3%
8.9%	992.6	1016.3	1041.9	1069.4	1099.1	1131.4	**1166.5**
9.9%	871.9	888.8	906.8	926.0	946.6	968.6	992.4
10.9%	780.4	792.9	806.0	819.9	834.7	850.4	867.1
11.9%	709.3	718.7	728.5	**738.9**	749.9	761.4	773.6
12.9%	652.9	660.1	667.6	675.6	683.9	692.6	701.8
13.9%	607.4	613.0	618.9	625.0	631.5	638.2	645.2
14.9%	**570.1**	574.6	579.3	584.1	589.2	594.4	599.9

Source: Author Estimates

Table 13 - FCFF Sensitivity to WACC and EBIT Margin

Terminal WACC \ EBIT Margin	34.0%	35.0%	36.0%	37.0%	38.0%	39.0%	40.0%
8.9%	975.5	1006.8	1038.1	1069.4	1100.7	1132.0	**1163.3**
9.9%	847.1	873.4	899.7	926.0	952.3	978.6	1004.9
10.9%	752.2	774.7	797.3	819.9	842.5	865.1	887.7
11.9%	679.6	699.4	719.2	**738.9**	758.7	778.4	798.2
12.9%	622.9	640.5	658.0	675.6	693.1	710.6	728.2
13.9%	577.7	593.5	609.3	625.0	640.8	656.6	672.4
14.9%	**541.1**	555.4	569.8	584.1	598.5	612.8	627.2

Source: Author Estimates

Monte-Carlo Simulation

To complement to previously explained sensitivity analyses, a Monte-Carlo Simulation was performed using three main variables for the base case DCF model: terminal WACC, EBIT margin and terminal growth rate, including 100,000 observations of the target price. The triangular distribution was used to display variation and obtain a target price, providing a simple representation of the uncertainty of these variables. Given how different the company is expected to be in the future, using the normal distribution and estimating standard deviation using historical or peer-based information would not be an accurate representation of uncertainty. **Table 14** shows that the average target price was **US$ 745** per share, with an upside potential of **21.1%**. While almost half of the simulated prices are above the target price (**49.73%**), **90%** are above the closing price of January 31st, supporting the result yielded by the DCF valuation.

Table 14 - Monte Carlo Simulation Statistics

Monte Carlo Statistics	
Observations	100000
Base Case	739
Mean	745
Median	739
Mode	737
Std. Deviation	103
Variance	10606
Skewness	0.3621
Kurtosis	2.97
Minimum	468
Maximum	1242

Source: Author Estimates

Table 15 - Monte Carlo Simulation Variable Sensitivity

Variable Sensitivity	
Terminal WACC	-76.9%
EBIT Margin	21.1%
Terminal Growth Rate	2%

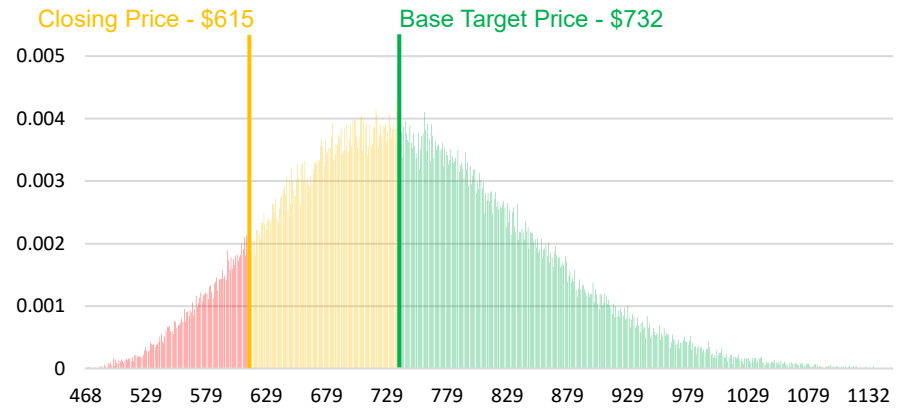
Source: Author Estimates

Table 16 - Monte Carlo Value Range

Variables	Min	Max
Terminal WACC	9.89%	13.89%
EBIT Margin	27%	47%
Terminal Growth Rate	1.5%	3.5%

Source: Author Estimates

Figure 33 - Monte Carlo Simulation



Source: Author Estimates

Appendices

Appendix A – Balance Sheet

Balance Sheet

	2018	2019	2020	2021	2022	2023	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	Assumption
Cash and Equivalents	7,422	10,897	11,561	21,208	13,296	25,984	66,667	143,699	255,902	394,010	557,614	737,854	935,898	1,143,728	1,358,756	1,580,329	CF Statement
Accounts Receivable	1,424	1,657	2,429	4,650	3,827	9,999	25,412	40,825	56,238	71,651	87,063	102,476	117,889	133,302	148,715	164,128	Revenue Growth
Inventory	1,575	979	1,826	2,605	5,159	5,282	14,158	24,434	35,985	48,811	62,911	78,287	94,938	112,863	132,064	152,540	COGS Growth
Prepaid Expenses	136	157	239	366	791	3,080	7,828	12,575	17,323	22,071	26,818	31,566	36,314	41,061	45,809	50,556	Revenue Growth
Total Current Assets	**10,557**	**13,690**	**16,055**	**28,829**	**23,073**	**44,345**	**114,065**	**221,533**	**365,448**	**536,541**	**734,407**	**950,184**	**1,185,038**	**1,430,954**	**1,685,344**	**1,947,553**	
Net PPE	1,404	2,292	2,856	3,607	4,845	3,914	6,696	11,460	18,349	27,435	38,723	52,150	67,587	84,833	103,623	123,623	See PP&E Schedule
Goodwill and Intangibles	663	667	6,930	6,688	6,048	5,542	4,987	4,726	4,576	4,539	4,530	4,430	4,330	4,230	4,130	4,030	Amortization
Other Non-Current Assets	668	666	2,950	5,063	7,216	11,927	11,927	11,927	11,927	11,927	11,927	11,927	11,927	11,927	11,927	11,927	
Total Non-Current Assets	**2,735**	**3,625**	**12,736**	**15,358**	**18,109**	**21,383**	**23,610**	**28,113**	**34,852**	**43,901**	**55,180**	**68,507**	**83,844**	**100,990**	**119,680**	**139,580**	
Total Assets	**13,292**	**17,315**	**28,791**	**44,187**	**41,182**	**65,728**	**137,675**	**249,646**	**400,300**	**580,442**	**789,587**	**1,018,691**	**1,268,882**	**1,531,944**	**1,805,024**	**2,087,133**	
Accounts Payable	511	687	1,201	1,783	1,193	2,699	6,859	11,020	15,180	19,340	23,501	27,661	31,821	35,982	40,142	44,303	Revenue Growth
Short-Term Debt	–	91	1,120	144	1,426	1,250	1,250	–	1,000	–	1,250	–	1,500	1,250	–	–	See Debt Schedule
Other Current Liabilities	818	1,006	1,604	2,408	3,944	6,682	16,982	27,282	37,582	47,882	58,182	68,482	78,781	89,081	99,381	109,681	Revenue Growth
Total Current Liabilities	**1,329**	**1,784**	**3,925**	**4,335**	**6,563**	**10,631**	**25,091**	**38,302**	**53,762**	**67,222**	**82,932**	**96,143**	**112,103**	**126,313**	**139,524**	**153,984**	
Long Term Debt	1,988	2,552	6,598	11,687	10,605	9,578	9,578	9,578	9,578	9,578	9,578	9,578	9,578	9,578	9,578	9,578	See Debt Schedule
Other Liabilities	633	775	1,375	1,553	1,913	2,541	2,541	2,541	2,541	2,541	2,541	2,541	2,541	2,541	2,541	2,541	
Total Non-Current Liabilities	**2,621**	**3,327**	**7,973**	**13,240**	**12,518**	**12,119**	**12,119**	**12,119**	**12,119**	**12,119**	**12,119**	**12,119**	**12,119**	**12,119**	**12,119**	**12,119**	
Total Liabilities	**3,950**	**5,111**	**11,898**	**17,575**	**19,081**	**22,750**	**37,210**	**50,421**	**65,881**	**79,341**	**95,051**	**108,262**	**124,222**	**138,432**	**151,643**	**166,103**	
Additional Paid-In Capital	6,052	7,046	8,722	10,388	11,973	13,134	25,060	43,748	68,843	99,991	136,835	179,021	226,194	277,997	334,077	394,077	APIC(t-1) + SBC(t)
Retained Earnings	12,565	14,971	18,908	16,235	10,171	29,817	95,378	195,451	325,549	481,084	657,673	851,381	1,058,439	1,275,488	1,499,278	1,726,926	RE(t-1) + NI(t)
Treasury Stock	(9,263)	(9,814)	(10,756)	–	–	–	(20,000)	(40,000)	(60,000)	(80,000)	(100,000)	(120,000)	(140,000)	(160,000)	(180,000)	(200,000)	See CFS
Other Equity	(12)	1	19	(11)	(43)	27	27	27	27	27	27	27	27	27	27	27	
Total Equity	**9,342**	**12,204**	**16,893**	**26,612**	**22,101**	**42,978**	**100,464**	**199,226**	**334,419**	**501,101**	**694,535**	**910,430**	**1,144,660**	**1,393,512**	**1,653,381**	**1,921,030**	
Total Equity & Liabilities	**13,292**	**17,315**	**28,791**	**44,187**	**41,182**	**65,728**	**137,675**	**249,646**	**400,300**	**580,442**	**789,587**	**1,018,691**	**1,268,882**	**1,531,944**	**1,805,024**	**2,087,133**	

Balance Sheet - Common Size														
(In % of Total Assets)	2020	2021	2022	2023	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F
Cash and Equivalents	40%	48%	32%	40%	48%	58%	64%	68%	71%	72%	74%	75%	75%	76%
Accounts Receivable	8%	11%	9%	15%	18%	16%	14%	12%	11%	10%	9%	9%	8%	8%
Inventory	6%	6%	13%	8%	10%	10%	9%	8%	8%	8%	7%	7%	7%	7%
Prepaid Expenses	1%	1%	2%	5%	6%	5%	4%	4%	3%	3%	3%	3%	3%	2%
Total Current Assets	**56%**	**65%**	**56%**	**67%**	**83%**	**89%**	**91%**	**92%**	**93%**	**93%**	**93%**	**93%**	**93%**	**93%**
Net PPE	10%	8%	12%	6%	5%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Goodwill and Intangibles	24%	15%	15%	8%	4%	2%	1%	1%	1%	0%	0%	0%	0%	0%
Other Non-Current Assets	10%	11%	18%	18%	9%	5%	3%	2%	2%	1%	1%	1%	1%	1%
Total Non-Current Assets	**44%**	**35%**	**44%**	**33%**	**17%**	**11%**	**9%**	**8%**	**7%**	**7%**	**7%**	**7%**	**7%**	**7%**
Total Assets	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Accounts Payable	4%	4%	3%	4%	5%	4%	4%	3%	3%	3%	3%	2%	2%	2%
Short-Term Debt	4%	0%	3%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Current Liabilities	6%	5%	10%	10%	12%	11%	9%	8%	7%	7%	6%	6%	6%	5%
Total Current Liabilities	**14%**	**10%**	**16%**	**16%**	**18%**	**15%**	**13%**	**12%**	**11%**	**9%**	**9%**	**8%**	**8%**	**7%**
Long Term Debt	23%	26%	26%	15%	7%	4%	2%	2%	1%	1%	1%	1%	1%	0%
Other Liabilities	5%	4%	5%	4%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Total Non-Current Liabilities	**28%**	**30%**	**30%**	**18%**	**9%**	**5%**	**3%**	**2%**	**2%**	**1%**	**1%**	**1%**	**1%**	**1%**
Total Liabilities	**41%**	**40%**	**46%**	**35%**	**27%**	**20%**	**16%**	**14%**	**12%**	**11%**	**10%**	**9%**	**8%**	**8%**
Additional Paid-In Capital	30%	24%	29%	20%	18%	18%	17%	17%	17%	18%	18%	18%	19%	19%
Retained Earnings	66%	37%	25%	45%	69%	78%	81%	83%	83%	84%	83%	83%	83%	83%
Treasury Stock	-37%	0%	0%	0%	-15%	-16%	-15%	-14%	-13%	-12%	-11%	-10%	-10%	-10%
Other Equity	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Equity	**59%**	**60%**	**54%**	**65%**	**73%**	**80%**	**84%**	**86%**	**88%**	**89%**	**90%**	**91%**	**92%**	**92%**
Total Equity & Liabilities	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Appendix B – Annual Income Statement

Annual Income Statement																	
(In millions of US$)	2018	2019	2020	2021	2022	2023	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	Assumption
Revenue	**11,716**	**10,918**	**16,675**	**26,914**	**26,974**	**60,922**	**154,830**	**248,738**	**342,645**	**436,553**	**530,461**	**624,369**	**718,277**	**812,184**	**906,092**	**1,000,000**	**See Market Sh.**
AI Chip	2,932	2,983	6,696	10,613	15,005	47,525	102,773	158,020	213,268	268,515	323,763	379,010	434,258	489,505	544,753	600,000	See Market Sh.
Gaming	7,376	6,730	8,812	14,573	10,611	12,000	20,800	29,600	38,400	47,200	56,000	64,800	73,600	82,400	91,200	100,000	See Market Sh.
Auto & Other	1,408	1,205	1,167	1,728	1,358	1,397	31,257	61,118	90,978	120,838	150,699	180,559	210,419	240,279	270,140	300,000	See Market Sh.
Less: Cost of Sales	(4,545)	(4,150)	(6,280)	(9,440)	(11,618)	(16,621)	(44,552)	(76,887)	(113,235)	(153,594)	(197,965)	(246,348)	(298,743)	(355,150)	(415,569)	(480,000)	Revenues - Gross Profit
Gross Profit	**7,171**	**6,768**	**10,395**	**17,474**	**15,356**	**44,301**	**110,278**	**171,850**	**229,411**	**282,959**	**332,496**	**378,021**	**419,534**	**457,034**	**490,523**	**520,000**	**Diff. Op. Income + Op. Expense**
Less: SG&A	(992)	(1,094)	(1,938)	(2,166)	(2,440)	(2,654)	(7,741)	(12,437)	(17,132)	(21,828)	(26,523)	(31,218)	(35,914)	(40,609)	(45,305)	(50,000)	See Assumptions Table
Less: R&D	(2,375)	(2,828)	(3,925)	(5,267)	(7,339)	(8,675)	(21,391)	(33,310)	(44,433)	(54,760)	(64,291)	(73,025)	(80,963)	(88,105)	(94,451)	(100,000)	See Assumptions Table
Less: Unusual Expense	–	–	–	–	(1,353)	–	–	–	–	–	–	–	–	–	–	–	
EBIT	**3,804**	**2,846**	**4,532**	**10,041**	**4,224**	**32,972**	**81,146**	**126,103**	**167,845**	**206,372**	**241,682**	**273,777**	**302,657**	**328,320**	**350,768**	**370,000**	**Op. Margin Forecast**
Less: Interest Expense	(58)	(52)	(185)	(236)	(262)	(257)	(257)	(257)	(257)	(257)	(257)	(257)	(257)	(257)	(257)	(257)	See Interest Expense Schedule
Plus: Interest Income	136	177	58	76	199	866	531	1,037	2,660	5,734	10,210	15,721	22,249	29,440	37,342	45,635	See Interest Expense Schedule
Plus: Other Non-Operating Income	14	(1)	3	60	20	237	–	–	–	–	–	–	–	–	–	–	
EBT	**3,896**	**2,970**	**4,408**	**9,941**	**4,181**	**33,818**	**80,872**	**125,324**	**165,442**	**200,895**	**231,729**	**258,313**	**280,665**	**299,137**	**313,683**	**324,622**	
Less: Provision for Income Taxes	(123)	(174)	(76)	(188)	187	(4,058)	(10,756)	(18,297)	(26,305)	(34,553)	(42,869)	(51,146)	(59,220)	(67,006)	(74,343)	(81,156)	Tax Rate * EBT
Net Profit	**3,773**	**2,796**	**4,332**	**9,753**	**4,368**	**29,760**	**70,116**	**107,027**	**139,138**	**166,342**	**188,860**	**207,168**	**221,445**	**232,130**	**239,340**	**243,467**	
Plus: Extraordinary Items	368	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Net Income	**4,141**	**2,796**	**4,332**	**9,753**	**4,368**	**29,760**	**70,116**	**107,027**	**139,138**	**166,342**	**188,860**	**207,168**	**221,445**	**232,130**	**239,340**	**243,467**	

Annual Income Statement - Common Size														
(In % of Revenues)	2020	2021	2022	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F
Revenue	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
AI Chip	25%	27%	40%	39%	56%	78%	66%	64%	62%	62%	61%	61%	60%	60%
Gaming	63%	62%	53%	54%	39%	20%	13%	12%	11%	11%	11%	10%	10%	10%
Auto & Other	12%	11%	7%	6%	5%	2%	20%	25%	27%	28%	28%	29%	29%	30%
Cost of Sales	-39%	-38%	-38%	-35%	-43%	-27%	-29%	-31%	-33%	-35%	-37%	-39%	-42%	-44%
Gross Profit	**61%**	**62%**	**62%**	**65%**	**57%**	**73%**	**71%**	**69%**	**67%**	**65%**	**63%**	**61%**	**58%**	**56%**
SG&A	-8%	-10%	-12%	-8%	-9%	-4%	-5%	-5%	-5%	-5%	-5%	-5%	-5%	-5%
R&D	-20%	-26%	-24%	-20%	-27%	-14%	-14%	-13%	-13%	-13%	-12%	-12%	-11%	-11%
Unusual Expense	0%	0%	0%	0%	-5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EBIT	**32%**	**26%**	**27%**	**37%**	**16%**	**54%**	**52%**	**51%**	**49%**	**47%**	**46%**	**44%**	**42%**	**40%**
Interest Expense	0%	0%	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Interest Income	1%	2%	0%	0%	1%	1%	0%	0%	1%	1%	2%	3%	3%	4%
Other Non-Operating Income	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EBT	**33%**	**27%**	**26%**	**37%**	**16%**	**56%**	**52%**	**50%**	**48%**	**46%**	**44%**	**41%**	**39%**	**37%**
Provision for Income Taxes	-1%	-2%	0%	-1%	1%	-7%	-7%	-7%	-8%	-8%	-8%	-8%	-8%	-8%
Net Profit	**32%**	**26%**	**26%**	**36%**	**16%**	**49%**	**45%**	**43%**	**41%**	**38%**	**36%**	**33%**	**31%**	**29%**
Extraordinary Items	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Net Income	**35%**	**26%**	**26%**	**36%**	**16%**	**49%**	**45%**	**43%**	**41%**	**38%**	**36%**	**33%**	**31%**	**29%**

Cash Flow Statement - Reported						
(In millions of US$)	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Net Income	4,141	2,796	4,332	9,752	4,368	29,760
Depreciation	262	381	1,098	1,174	1,544	1,508
Deferred Taxes	(315)	18	(282)	(406)	(2,164)	(2,489)
Non-Cash Items	512	849	1,377	1,951	4,100	3,033
Changes in Working Capital	(857)	717	(703)	(3,363)	(2,207)	(3,722)
Accounts Receivable	(149)	(233)	(550)	(2,215)	822	(6,172)
Inventories	(776)	597	(524)	(774)	(2,554)	(98)
Prepaid Expenses	(55)	77	(394)	(1,715)	(1,517)	(1,522)
Accounts Payable	(135)	194	363	568	(551)	1,531
Accrued Expenses	256	54	239	581	1,341	2,025
Other Liabilities	2	28	163	192	252	514
Cash from Operating Activities	**3,743**	**4,761**	**5,822**	**9,108**	**5,641**	**28,090**
Capital Expenditures (CAPEX)	(600)	(489)	(1,128)	(976)	(1,833)	(1,069)
Other Investing Cash Flow Items	(3,497)	6,634	(18,547)	(8,854)	9,208	–
Acquisition of Business	–	–	(8,524)	(263)	(49)	(83)
Sale/Maturity of Investment	7,660	8,109	9,319	16,220	21,231	9,782
Investment	(9)	(12)	(34)	(24)	(77)	(985)
Purchase of Investments	(11,148)	(1,461)	(19,308)	(24,787)	(11,897)	(18,211)
Cash from Investing Activities	**(4,097)**	**6,145**	**(19,675)**	**(9,830)**	**7,375**	**(10,566)**
Financing Cash Flow Items	(1,037)	(551)	(963)	(1,994)	(1,535)	(2,858)
Total Cash Dividends Paid	(371)	(390)	(395)	(399)	(398)	(395)
Net Issuance of Stock	(1,442)	149	194	281	(9,684)	(9,130)
Net Issuance of Debt	(16)	–	4,968	3,977	–	(1,250)
Cash from Financing Activities	**(2,866)**	**(792)**	**3,804**	**1,865**	**(11,617)**	**(13,633)**
Net Cash - Beginning Balance	**4,002**	**782**	**10,896**	**847**	**1,990**	**3,389**
Net Change in Cash	(3,220)	10,114	(12,300)	(145)	(1,401)	3,891
Net Cash - Ending Balance	**782**	**10,896**	**(1,404)**	**702**	**589**	**7,280**

Forecasted Cash Flow Statement											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
Net Income		70,116	107,027	139,138	166,342	188,860	207,168	221,445	232,130	239,340	243,467
Depreciation and Amortization		5,012	8,602	13,350	19,133	26,201	34,367	43,773	54,486	66,576	80,109
Stock-Based Compensation		11,926	18,688	25,096	31,148	36,844	42,186	47,172	51,804	56,079	60,000
Change in Net Working Capital		(14,577)	(15,976)	(17,251)	(18,526)	(19,801)	(21,076)	(22,351)	(23,626)	(24,901)	(26,176)
Cash Flow from Operating Activities (CFO)		**72,477**	**118,341**	**160,333**	**198,096**	**232,104**	**262,645**	**290,039**	**314,794**	**337,094**	**357,400**
Capital Expenditures (CapEx)		(7,252)	(13,120)	(20,097)	(28,184)	(37,380)	(47,685)	(59,100)	(71,624)	(85,257)	(100,000)
Cash Flow from Investing Activities (CFI)		**(7,252)**	**(13,120)**	**(20,097)**	**(28,184)**	**(37,380)**	**(47,685)**	**(59,100)**	**(71,624)**	**(85,257)**	**(100,000)**
Cash Dividends Paid		(4,555)	(6,954)	(9,040)	(10,807)	(12,270)	(13,460)	(14,387)	(15,082)	(15,550)	(15,818)
Net Issuance of Stock	(12,000)	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Net Issuance of Debt		–	(1,250)	1,000	(1,000)	1,250	(1,250)	1,500	(250)	(1,250)	–
Cash Flow from Financing Activities (CFF)		**(24,555)**	**(28,204)**	**(28,040)**	**(31,807)**	**(31,020)**	**(34,710)**	**(32,887)**	**(35,332)**	**(36,800)**	**(35,818)**
Cash, BoP		**25,984**	**66,653**	**143,671**	**255,866**	**393,972**	**557,676**	**737,925**	**935,978**	**1,143,817**	**1,358,854**
Plus: Net Change in Cash		40,669	77,018	112,195	138,105	163,704	180,250	198,052	207,839	215,037	221,582
Cash, EoP	**25,984**	**66,653**	**143,671**	**255,866**	**393,972**	**557,676**	**737,925**	**935,978**	**1,143,817**	**1,358,854**	**1,580,436**

Forecasted Cash Flow Statement - Common Size										
(In millions of US$)	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
Net Income	97%	90%	87%	84%	81%	79%	76%	74%	71%	68%
Depreciation and Amortization	7%	7%	8%	10%	11%	13%	15%	17%	20%	22%
Stock-Based Compensation	16%	16%	16%	16%	16%	16%	16%	16%	17%	17%
Change in Net Working Capital	-20%	-14%	-11%	-9%	-9%	-8%	-8%	-8%	-7%	-7%
Cash Flow from Operating Activities (CFO)	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Capital Expenditures (CapEx)	-10%	-11%	-13%	-14%	-16%	-18%	-20%	-23%	-25%	-28%
Cash Flow from Investing Activities (CFI)	**-10%**	**-11%**	**-13%**	**-14%**	**-16%**	**-18%**	**-20%**	**-23%**	**-25%**	**-28%**
	0%	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Cash Dividends Paid	-6%	-6%	-6%	-5%	-5%	-5%	-5%	-5%	-5%	-4%
Net Issuance of Stock	-28%	-17%	-12%	-10%	-9%	-8%	-7%	-6%	-6%	-6%
Net Issuance of Debt	0%	-1%	1%	-1%	1%	0%	1%	0%	0%	0%
Cash Flow from Financing Activities (CFF)	**-34%**	**-24%**	**-17%**	**-16%**	**-13%**	**-13%**	**-11%**	**-11%**	**-11%**	**-10%**
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cash, BoP	**36%**	**56%**	**90%**	**129%**	**170%**	**212%**	**254%**	**297%**	**339%**	**380%**
Plus: Net Change in Cash	56%	65%	70%	70%	71%	69%	68%	66%	64%	62%
Cash, EoP	**92%**	**121%**	**160%**	**199%**	**240%**	**281%**	**323%**	**363%**	**403%**	**442%**

Appendix D – Key Historical Financial Ratios

Key Financial Ratios	Formula	2018	2019	2020	2021	2022	2023	CAGR
Profitability Ratios								
ROE	Net Income / Shareholders' Equity	44%	23%	26%	37%	20%	69%	9%
ROA	Net Income / Total Assets	31%	16%	15%	22%	11%	45%	8%
ROC	EBIT(1-t) / (BV Equity + BV Debt - Cash)	94%	68%	34%	57%	19%	73%	-5%
ROCE	EBIT / (Total Assets - Current Liabilities)	32%	18%	18%	25%	12%	60%	13%
Reinvestment Rate	(Net CapEx + Change in WC) / EBIT(1-t)	NA	-21%	28%	21%	54%	16%	29%
Fundamental Growth Rate	ROC * Reinvestment Rate	NA	-15%	9%	12%	11%	11%	29%
Non-Cash ROE	NI - Interest Income(1-t) / (BV Equity - Cash)	209%	201%	80%	179%	47%	171%	-4%
Dividend Payout Ratio	Dividends / Net Income	9%	14%	9%	4%	9%	1%	-32%
Gross Profit Margin	Gross Profit / Revenues	61%	62%	62%	65%	57%	73%	4%
EBIT Margin	EBIT / Revenues	32%	26%	27%	37%	16%	54%	11%
Net Profit Margin	Net Income / Revenues	35%	26%	26%	36%	16%	49%	7%
Interest Rate	Interest Expenses / Total Debt	3%	2%	2%	2%	2%	2%	-4%
Tax Rate	Taxes / EBT	3%	6%	2%	2%	4%	12%	31%
Liquidity Ratios								
Current Ratio	Current Assets / Current Liabilities	7.94	7.67	4.09	6.65	3.52	4.17	-12%
Quick Ratio	(Current Assets - Inventory) / Current Liabilities	6.76	7.13	3.63	6.05	2.73	3.67	-11%
Cash Ratio	(Cash + Marketable Securities) / Current Liabilities	5.58	6.11	2.95	4.89	2.03	2.44	-15%
Interest Coverage	EBITDA / Interest Expense	80	78	38	56	32	148	13%
Leverage Ratio	Debt / Total Assets	15%	15%	27%	27%	29%	16%	2%
Capital Structure Ratios								
Debt-to-Equity	Total Liabilities / Shareholders' Equity	42%	42%	70%	66%	86%	53%	5%
Net Debt-to-Equity	(Total Debt - Cash) / Shareholders' Equity	-58%	-68%	-23%	-35%	-6%	-35%	-10%
LT Debt to Equity	Non-Current Debt / Shareholders' Equity	21%	21%	39%	44%	48%	22%	1%
LT Debt to Assets	Non-Current Debt / Total Assets	15%	15%	23%	26%	26%	15%	-1%
Turnover Ratios								
Days' Accounts Receivable	(Accs. Receivable / Revenues) * 365	44	55	53	63	52	60	4%
Days' Accounts Payable	(Accs. Payable / COGS) * 365	41	60	70	69	37	59	-2%
Days' Inventory	(Inventory / COGS) * 365	126	86	106	101	162	116	6%
Cash Conversion Cycle	Days' Inventory + Days' AR - Days' AP	212	202	229	233	251	235	4%
Assets Turnover	Revenues / Assets	0.88	0.63	0.58	0.61	0.65	0.93	-7%
PPE Turnover	Revenues / Net PPE	8.34	4.76	5.84	7.46	5.57	15.57	-10%
Economic Value Added								
NOPAT	EBIT * (1 - Tax Rate)	3,684	2,679	4,454	9,851	4,035	29,016	51%
Invested Capital Cost	(Debt + Equity - Cash) * WACC	659	666	2,201	2,906	3,514	4,692	48%
Economic Value Added	NOPAT - Invested Capital	3,025	2,013	2,253	6,945	522	24,324	52%

Appendix E – Forecasted Key Financial Ratios

Key Financial Ratios	Formula	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F
Profitability Ratios											
ROE	Net Income/ Shareholders' Equity	70%	54%	42%	33%	27%	23%	19%	17%	14%	13%
ROA	Net Income/ Total Assets	51%	43%	35%	29%	24%	20%	17%	15%	13%	12%
ROC	EBIT(1-t)/(BV Equity + BV Debt - Cash)	99%	102%	98%	92%	85%	78%	72%	66%	60%	55%
ROCE	EBIT/(Total Assets - Current Liabilities)	72%	60%	48%	40%	34%	30%	26%	23%	21%	19%
Reinvestment Rate	(Net CapEx + Change in WC)/EBIT(1-t)	25%	19%	17%	16%	16%	16%	16%	16%	16%	17%
Fundamental Growth Rate	ROC * Reinvestment Rate	24%	20%	17%	15%	13%	12%	11%	11%	10%	9%
Non-Cash ROE	NI - Int.Inc(1-t)/(BV Equity - Cash)	206%	191%	174%	151%	132%	113%	98%	84%	72%	61%
Dividend Payout Ratio	Dividends/Net Income	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Gross Profit Margin	Gross Profit/Revenues	71%	69%	67%	65%	63%	61%	58%	56%	54%	52%
EBIT Margin	EBIT/Revenues	52%	51%	49%	47%	46%	44%	42%	40%	39%	37%
Net Profit Margin	Net Income/Revenues	45%	43%	41%	38%	36%	33%	31%	29%	26%	24%
Interest Rate	Interest Expenses/Total Debt	2%	3%	2%	3%	2%	3%	2%	2%	3%	3%
Tax Rate	Taxes/EBT	13%	15%	16%	17%	18%	20%	21%	22%	24%	25%
Liquidity Ratios											
Current Ratio	Current Assets/ Current Liabilities	4.5	5.8	6.8	8.0	8.9	9.9	10.6	11.3	12.1	12.6
Quick Ratio	(Current Assets - Inventory)/ Current Liabilities	4.0	5.1	6.1	7.3	8.1	9.1	9.7	10.4	11.1	11.7
Cash Ratio	(Cash + Marketable Securities)/ Current Liabilities	2.7	3.8	4.8	5.9	6.7	7.7	8.3	9.1	9.7	10.3
Interest Coverage	EBITDA/ Interest Expense	382	597	803	999	1185	1363	1531	1691	1842	1985
Leverage Ratio	Debt/Total Assets	8%	4%	3%	2%	1%	1%	1%	1%	1%	0%
Capital Structure Ratios											
Debt-to-Equity	Total Liabilities/ Shareholders' Equity	37%	25%	20%	16%	14%	12%	11%	10%	9%	9%
Net Debt-to-Equity	(Total Debt - Cash)/Shareholders' Equity	-56%	-67%	-73%	-77%	-79%	-80%	-81%	-81%	-82%	-82%
LT Debt to Equity	Non-Current Debt/Shareholders' Equity	10%	5%	3%	2%	1%	1%	1%	1%	1%	0%
LT Debt to Assets	Non-Current Debt/Total Assets	7%	4%	2%	2%	1%	1%	1%	1%	1%	0%
Turnover Ratios											
Days' Accounts Receivable	(Accs. Receivable/Revenues)*365	60	60	60	60	60	60	60	60	60	60
Days' Accounts Payable	(Accs. Payable/COGS)*365	56	52	49	46	43	41	39	37	35	34
Days' Inventory	(Inventory/COGS)*365	116	116	116	116	116	116	116	116	116	116
Cash Conversion Cycle	Days' Inventory + Days' AR - Days' AP	232	228	225	222	219	217	215	213	211	210
Assets Turnover	Revenues/ Assets	1.12	1.00	0.86	0.75	0.67	0.61	0.57	0.53	0.50	0.48
PPE Turnover	Revenues/ Net PPE	23.12	21.70	18.67	15.91	13.70	11.97	10.63	9.57	8.74	8.09
Economic Value Added											
NOPAT	EBIT * (1-Tax Rate)	70,354	107,693	141,159	170,876	196,972	219,570	238,796	254,777	267,636	277,500
Invested Capital Cost	(Debt + Equity - Cash) * WACC	7,338	10,436	13,914	17,742	21,866	26,219	30,757	35,416	40,127	44,815
Economic Value Added	NOPAT - Invested Capital	63,016	97,257	127,245	153,134	175,106	193,351	208,039	219,360	227,509	232,685

Appendix F – Forecasting Assumptions

Valuation Assumptions	2023	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	Assumption
Operating Profit Margin	54.1%	52.4%	50.7%	49.0%	47.3%	45.6%	43.8%	42.1%	40.4%	38.7%	37.0%	Converge to pre-Covid margin of 37%
R&D Margin	14.2%	13.8%	13.4%	13.0%	12.5%	12.1%	11.7%	11.3%	10.8%	10.4%	10.0%	Converge to 10%
SG&A Margin	4.4%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	Converge to 5%
Tax Rate	12.0%	13.3%	14.6%	15.9%	17.2%	18.5%	19.8%	21.1%	22.4%	23.7%	25.0%	Converge to Marginal Rate
Capital Expenditures (% of Rev.)	1.8%	4.7%	5.3%	5.9%	6.5%	7.0%	7.6%	8.2%	8.8%	9.4%	10.0%	Converge to 10%
Depreciation (% of CapEx)	83.6%	61.6%	63.7%	65.7%	67.8%	69.8%	71.8%	73.9%	75.9%	78.0%	80.0%	Past 5Y Average - Converge to 80%
Dividend Payout Ratio	1.3%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	Maintain 5Y Average
LT Debt Interest Rate	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	Maintain Current
Cash Interest Rate	6.5%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	Current Risk Free Rate

Appendix G – Revenue Forecast

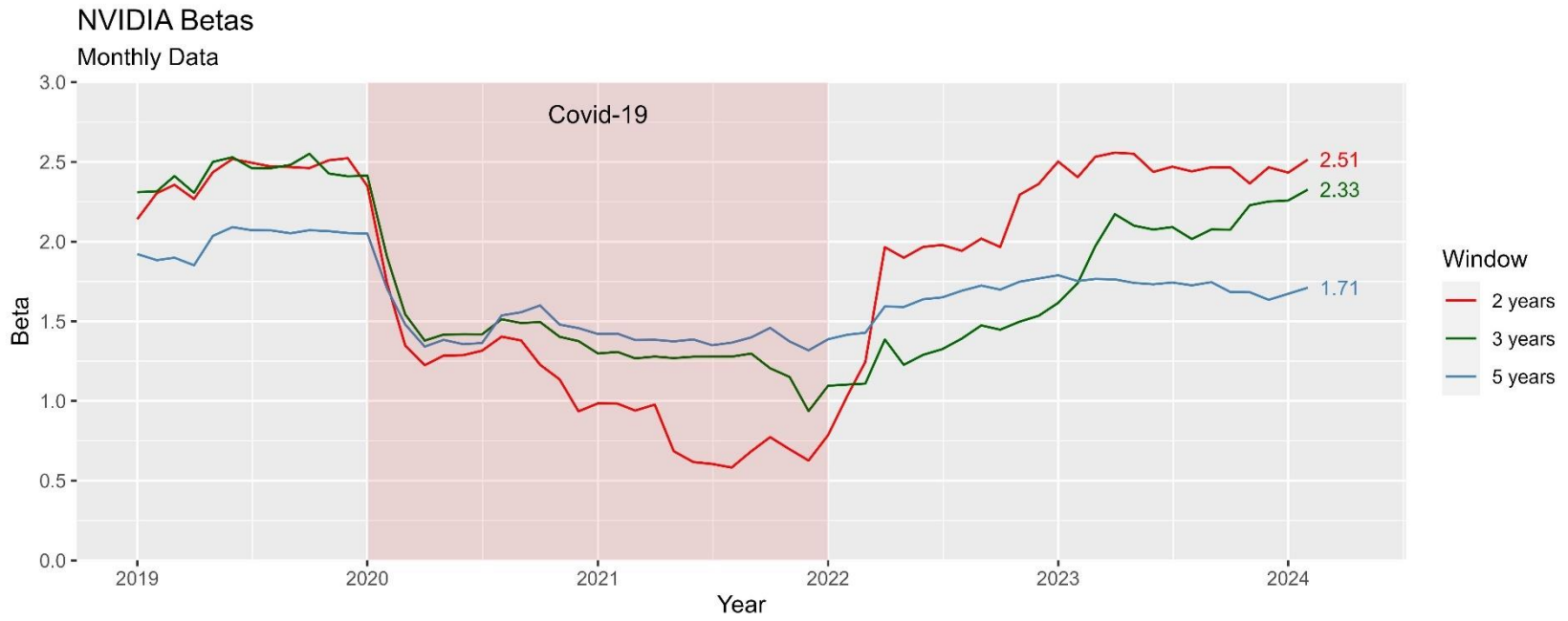
Market Forecast	2023	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F
AI Chip Market											
Base Case	47,525	102,773	158,020	213,268	268,515	323,763	379,010	434,258	489,505	544,753	600,000
Bull Case (10%)		113,050	173,822	234,594	295,367	356,139	416,911	477,683	538,456	599,228	660,000
Bear Case (-15%)		87,357	134,317	181,277	228,238	275,198	322,159	369,119	416,079	463,040	510,000
Gaming Market											
Base Case	12,000	20,800	29,600	38,400	47,200	56,000	64,800	73,600	82,400	91,200	100,000
Auto Market											
Base Case	1,397	31,257	61,118	90,978	120,838	150,699	180,559	210,419	240,279	270,140	300,000
Bull Case (20%)		37,509	73,341	109,173	145,006	180,838	216,671	252,503	288,335	324,168	360,000
Bear Case (-10%)		28,132	55,006	81,880	108,754	135,629	162,503	189,377	216,251	243,126	270,000
Forecasted Revenues by Segment											
NVIDIA AI	47,525	102,773	158,020	213,268	268,515	323,763	379,010	434,258	489,505	544,753	600,000
NVIDIA Gaming	12,000	20,800	29,600	38,400	47,200	56,000	64,800	73,600	82,400	91,200	100,000
NVIDIA Auto & Other	1,397	31,257	61,118	90,978	120,838	150,699	180,559	210,419	240,279	270,140	300,000
Total NVIDIA Revenues	**60,922**	**154,830**	**248,738**	**342,645**	**436,553**	**530,461**	**624,369**	**718,277**	**812,184**	**906,092**	**1,000,000**
Base Case Segment Revenues in %											
NVIDIA AI	78.0%	66.4%	63.5%	62.2%	61.5%	61.0%	60.7%	60.5%	60.3%	60.1%	60.0%
NVIDIA Gaming	20%	13%	12%	11%	11%	11%	10%	10%	10%	10%	10%
NVIDIA Auto	2%	20%	25%	27%	28%	28%	29%	29%	30%	30%	30%

Appendix H – Equity Risk Premium (ERP)

Country Equity Risk Premium	U.S.	Taiwan	China	Rest of the World
Market Risk Premium	4.6%	5.5%	5.6%	7.5%
Country Risk Premium	0.0%	0.9%	1.0%	2.9%
Country ERP	**4.6%**	**6.4%**	**6.7%**	**10.4%**

Rest of the World Data						
Region	**Weighted ERP**	**Weighted CRP**	**Weighted Spread**	**Tax Rate**	**Total GDP**	**Weight**
Africa	13.8%	9.2%	6.8%	27.3%	2,508,221	4.5%
Asia (without China, Taiwan, and Singapore)	7.2%	2.6%	1.9%	27.3%	13,863,978	25.0%
Australia & New Zealand	4.6%	0.0%	0.0%	29.7%	1,942,472	3.5%
Caribbean	18.8%	14.2%	10.5%	27.2%	869,389	1.6%
Central and South America	10.4%	5.8%	4.3%	31.6%	5,601,818	10.1%
Eastern Europe & Russia	9.7%	5.1%	3.8%	18.5%	5,010,073	9.0%
Middle East	6.8%	2.2%	1.6%	18.8%	3,382,578	6.1%
North America (without United States)	4.6%	0.0%	0.0%	26.5%	2,137,939	3.8%
Western Europe	5.9%	1.3%	1.0%	24.7%	20,250,229	36.4%

Appendix I – Beta Regression



Source: Dr. Aswath Damodaran
Retrieved on January 31st

Synthetic Rating Table			
Interest Coverage Ratio Range		Rating	Spread
-100000	0.199999	D2/D	20.00%
0.2	0.649999	C2/C	17.50%
0.65	0.799999	Ca2/CC	15.78%
0.8	1.249999	Caa/CCC	11.57%
1.25	1.499999	B3/B-	7.37%
1.5	1.749999	B2/B	5.26%
1.75	1.999999	B1/B+	4.55%
2	2.2499999	Ba2/BB	3.13%
2.25	2.49999	Ba1/BB+	2.42%
2.5	2.999999	Baa2/BBB	2.00%
3	4.249999	A3/A-	1.62%
4.25	5.499999	A2/A	1.42%
5.5	6.499999	A1/A+	1.23%
6.5	8.499999	Aa2/AA	0.85%
8.50	100000	Aaa/AAA	0.69%

Bonds

Description	Maturity Date	Settlement Date	First Coupon	Issued Amount	Coupon Rate	Coupon	Frequency	Current Price	Yield	Market Value
NVDA 0.584 14-Jun-2024 '23	14/06/2024	16/06/2021	16/12/2021	1250	0.58%	3.65	Semi-Annually	99.39	6.19%	1242.4
NVDA 3.200 16-Sep-2026 '26	16/09/2026	16/09/2016	16/03/2017	1000	3.20%	16	Semi-Annually	96.1	4.97%	961.0
NVDA 1.550 15-Jun-2028 '28	15/06/2028	16/06/2021	16/12/2021	1250	1.55%	10	Semi-Annually	87.71	4.89%	1096.4
NVDA 2.850 01-Apr-2030 '30	01/04/2030	31/03/2020	30/09/2020	1500	2.85%	21	Semi-Annually	88.59	5.15%	1328.9
NVDA 2.000 15-Jun-2031 '31	15/06/2031	16/06/2021	16/12/2021	1250	2.00%	13	Semi-Annually	82.08	5.07%	1026.0
NVDA 3.500 01-Apr-2040 '39	01/04/2040	31/03/2020	30/09/2020	1000	3.50%	18	Semi-Annually	80.49	5.37%	804.9
NVDA 3.500 01-Apr-2050 '49	01/04/2050	31/03/2020	30/09/2020	2000	3.50%	35	Semi-Annually	74.19	5.39%	1483.8
NVDA 3.700 01-Apr-2060 '59	01/04/2060	31/03/2020	30/09/2020	500	3.70%	9	Semi-Annually	74.54	5.41%	372.7
									Total	8,316.0

WACC		2023	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	Terminal
Risk-Free Rate		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Interest Coverage Ratio		148	382	597	803	999	1185	1363	1531	1691	1842	1985	
Synthetic Rating		A+	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	
Spread		1.2%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Pre-Tax Cost of Debt		**5.2%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.7%**
Tax Rate		12.0%	13.3%	14.6%	15.9%	17.2%	18.5%	19.8%	21.1%	22.4%	23.7%	25.0%	25.0%
After-Tax Cost of Debt		**4.6%**	**4.1%**	**4.0%**	**3.9%**	**3.9%**	**3.8%**	**3.8%**	**3.7%**	**3.6%**	**3.6%**	**3.5%**	**3.5%**
Revenue Distribution													
United States		44%	46%	47%	49%	51%	52%	54%	55%	57%	58%	60%	60%
Taiwan		22%	21%	21%	20%	19%	19%	18%	17%	16%	16%	15%	15%
China (including Hong Kong)		17%	16%	15%	13%	12%	11%	10%	9%	7%	6%	5%	5%
Rest of the World		17%	17%	17%	18%	18%	18%	19%	19%	19%	20%	20%	20%
Weighted ERP	**Country ERP**												
United States	4.6%	2.0%	2.1%	2.2%	2.3%	2.3%	2.4%	2.5%	2.5%	2.6%	2.7%	2.8%	2.8%
Taiwan	6.4%	1.4%	1.4%	1.3%	1.3%	1.2%	1.2%	1.1%	1.1%	1.0%	1.0%	1.0%	1.0%
China (including Hong Kong)	6.7%	1.1%	1.0%	1.0%	0.9%	0.8%	0.7%	0.7%	0.6%	0.5%	0.4%	0.3%	0.3%
Rest of the World	10.4%	1.8%	1.8%	1.8%	1.9%	1.9%	1.9%	2.0%	2.0%	2.0%	2.1%	2.1%	2.1%
Weighted Average ERP		**6.3%**	**6.3%**	**6.3%**	**6.3%**	**6.2%**	**6.2%**	**6.2%**	**6.2%**	**6.2%**	**6.2%**	**6.1%**	**6.1%**
Debt/Equity		0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Levered Beta		2.05	1.99	1.93	1.87	1.81	1.75	1.69	1.63	1.57	1.51	1.44	1.30
Cost of Equity		**16.9%**	**16.5%**	**16.1%**	**15.7%**	**15.3%**	**14.9%**	**14.5%**	**14.1%**	**13.7%**	**13.3%**	**12.9%**	**11.9%**
WACC		**16.86%**	**16.44%**	**16.03%**	**15.62%**	**15.21%**	**14.80%**	**14.39%**	**13.99%**	**13.59%**	**13.19%**	**12.79%**	**11.89%**

Appendix K – PP&E and Intangibles Schedule

PP&E and Intangibles											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
PP&E, BoP		**3914**	**6696**	**11460**	**18349**	**27435**	**38723**	**52150**	**67587**	**84833**	**103623**
Plus: CapEx	1069	7252	13120	20097	28184	37380	47685	59100	71624	85257	100000
Less: Depreciation	894	4471	8355	13208	19098	26092	34258	43664	54377	66467	80000
PP&E, EoP	**3914**	**6696**	**11460**	**18349**	**27435**	**38723**	**52150**	**67587**	**84833**	**103623**	**123623**
CapEx (% of Revenue)	1.8%	4.7%	5.3%	5.9%	6.5%	7.0%	7.6%	8.2%	8.8%	9.4%	10.0%
Depreciation (% of CapEx)	84%	62%	64%	66%	68%	70%	72%	74%	76%	78%	80%
Intangibles & Goodwill, BoP (No Goodwill Impairment)		**5542**	**4987**	**4726**	**4576**	**4539**	**4530**	**4430**	**4330**	**4230**	**4130**
Less: Amortization	614	555	261	150	37	9	100	100	100	100	100
Intangibles & Goodwill, EoP	**5542**	**4987**	**4726**	**4576**	**4539**	**4530**	**4430**	**4330**	**4230**	**4130**	**4030**
Depreciation & Amortization	**1508**	**5026**	**8616**	**13358**	**19135**	**26101**	**34358**	**43764**	**54477**	**66567**	**80100**

Appendix L – Non-GAAP Reconciliation

Non-GAAP Reconciliation											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
EBIT	32972	81146	126103	167845	206372	241682	273777	302657	328320	350768	370000
Plus: Stock-Based Compensation	3568	11926	18688	25096	31148	36844	42186	47172	51804	56079	60000
Adjusted EBIT	**36540**	**93071**	**144791**	**192941**	**237519**	**278527**	**315963**	**349829**	**380124**	**406847**	**430000**
Non-GAAP EBIT Margin, %	60%	60%	58%	56%	54%	53%	51%	49%	47%	45%	43%
Plus: Depreciation & Amortization	1508	5026	8616	13358	19135	26101	34358	43764	54477	66567	80100
Adjusted EBITDA	**38048**	**98097**	**153408**	**206299**	**256654**	**304628**	**350321**	**393593**	**434601**	**473414**	**510100**
Non-GAAP EBITDA Margin, %	62%	63%	62%	60%	59%	57%	56%	55%	54%	52%	51%
SBC % of Revenue	**5.86%**	**7.7%**	**7.5%**	**7.3%**	**7.1%**	**6.9%**	**6.8%**	**6.6%**	**6.4%**	**6.2%**	**6.0%**

Appendix M – Retained Earnings Schedule

Retained Earnings											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
Retained Earnings, BoP		**29817**	**95378**	**195451**	**325549**	**481084**	**657673**	**851381**	**1058439**	**1275488**	**1499278**
Plus: Net Income	29760	70116	107027	139138	166342	188860	207168	221445	232130	239340	243467
Less: Dividends	395	4555	6954	9040	10807	12270	13460	14387	15082	15550	15818
Retained Earnings, EoP	**29817**	**95378**	**195451**	**325549**	**481084**	**657673**	**851381**	**1058439**	**1275488**	**1499278**	**1726926**
Dividend Payout Ratio, %	1%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%

Appendix N – Debt Schedule

Debt Schedule											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
Long-Term Debt, EoP	**9578**	**9578**	**9578**	**9578**	**9578**	**9578**	**9578**	**9578**	**9578**	**9578**	**9578**
Plus: Debt Due		1250	0	1000	0	1250	0	1500	1250	0	0
Short-Term Debt, EoP	**1250**	**1250**	**0**	**1000**	**0**	**1250**	**0**	**1500**	**1250**	**0**	**0**
Total Debt, EoP	**10828**	**10828**	**9578**	**10578**	**9578**	**10828**	**9578**	**11078**	**10828**	**9578**	**9578**

Appendix O – Interest Schedule

Interest Expense											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
LT Debt Interest Rate, %	2.7%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Long-Term Debt, BoP	9578	9578	9578	9578	9578	9578	9578	9578	9578	9578	9578
Interest Expense	**257**	**257**	**257**	**257**	**257**	**257**	**257**	**257**	**257**	**257**	**257**
Cash Interest Rate, %	6.5%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Cash Balance, BoP	13296	25984	66667	143699	255902	394010	557614	737854	935898	1143728	1358756
Interest Income	**866**	**531**	**1037**	**2660**	**5734**	**10210**	**15721**	**22249**	**29440**	**37342**	**45635**

Appendix P – Working Capital Schedule

Working Capital											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
Accounts Receivable	9,999	25,412	40,825	56,238	71,651	87,063	102,476	117,889	133,302	148,715	164,128
Inventories	5,282	14,158	24,434	35,985	48,811	62,911	78,287	94,938	112,863	132,064	152,540
Prepaid Expenses	3,080	7,828	12,575	17,323	22,071	26,818	31,566	36,314	41,061	45,809	50,556
Plus: Asset Working Capital	**18,361**	**47,398**	**77,834**	**109,546**	**142,532**	**176,793**	**212,329**	**249,141**	**287,227**	**326,588**	**367,224**
Accounts Payable	2,699	6,859	11,020	15,180	19,340	23,501	27,661	31,821	35,982	40,142	44,303
Accrued Liabilities	6,682	16,982	27,282	37,582	47,882	58,182	68,482	78,781	89,081	99,381	109,681
Less: Liability Working Capital	**9,381**	**23,841**	**38,302**	**52,762**	**67,222**	**81,682**	**96,143**	**110,603**	**125,063**	**139,524**	**153,984**
Net Working Capital	**8,980**	**23,557**	**39,533**	**56,784**	**75,310**	**95,111**	**116,187**	**138,538**	**162,163**	**187,064**	**213,240**
Changes in Working Capital	4,340	14,577	15,976	17,251	18,526	19,801	21,076	22,351	23,626	24,901	26,176

Appendix Q – Earnings per Share (EPS) Schedule

Earnings Per Share (EPS) Schedule											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
Basic Shares Outstanding	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487	2,487
Diluted Shares Outstanding	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507
Net Differential	20	20	20	20	20	20	20	20	20	20	20
Basic EPS	**11.97**	**28.19**	**43.03**	**55.95**	**66.88**	**75.94**	**83.30**	**89.04**	**93.34**	**96.24**	**97.90**
Diluted EPS	**11.87**	**27.97**	**42.69**	**55.50**	**66.35**	**75.33**	**82.64**	**88.33**	**92.59**	**95.47**	**97.11**

Appendix R – Free Cash Flow to Firm (FCFF) Valuation Model

Free Cash Flow to Firm											
(In millions of US$)	**2023**	**2024F**	**2025F**	**2026F**	**2027F**	**2028F**	**2029F**	**2030F**	**2031F**	**2032F**	**2033F**
EBIT	32,972	81,146	126,103	167,845	206,372	241,682	273,777	302,657	328,320	350,768	370,000
Less: Taxes	(3,956)	(10,792)	(18,411)	(26,687)	(35,495)	(44,711)	(54,207)	(63,860)	(73,543)	(83,132)	(92,500)
NOPAT	**29,016**	**70,354**	**107,693**	**141,159**	**170,876**	**196,972**	**219,570**	**238,796**	**254,777**	**267,636**	**277,500**
Plus: D&A	1,508	5,026	8,616	13,358	19,135	26,101	34,358	43,764	54,477	66,567	80,100
Less: Increase in NWC	(4,340)	(14,577)	(15,976)	(17,251)	(18,526)	(19,801)	(21,076)	(22,351)	(23,626)	(24,901)	(26,176)
Less: CapEx	(1,069)	(7,252)	(13,120)	(20,097)	(28,184)	(37,380)	(47,685)	(59,100)	(71,624)	(85,257)	(100,000)
Free Cash Flow to Firm (FCFF)	**25,115**	**53,550**	**87,213**	**117,169**	**143,302**	**165,892**	**185,167**	**201,109**	**214,004**	**224,045**	**231,424**
FCFF Growth Rate, %	NA	113%	63%	34%	22%	16%	12%	9%	6%	5%	3%
WACC	17%	16%	16%	16%	15%	15%	14%	14%	14%	13%	12%
Discount Factor			1.012	0.875	0.762	0.669	0.591	0.525	0.471	0.424	0.411
Present Value of FCFF			**88,300**	**102,575**	**109,249**	**110,918**	**109,349**	**105,639**	**100,693**	**95,091**	**95,089**

FCFF Valuation	
(In millions of US$)	
Sum of Projected FCFF	916903
PV of Terminal Value	918988
Total Enterprise Value (TEV)	**1835891**
Minus: Total Debt	9435
Plus: Cash	25984
Equity Value	**1852440**
Diluted Shares Outstanding	2507
Implied Share Price	**739**

Terminal Year	
(In millions of US$)	
Growth Rate	2.5%
EBIT	400,482
EBIT(1-t)	300,362
Reinvestment Rate	21.03%
Reinvestment	63,152
FCFF	237,210
Terminal Value in Final Year	**2,526,077**

Appendix S – Relative Valuation

Forward Relative Data

Peer	EV/Sales	EV/EBITDA	EV/EBIT	P/E	Price/Book	P/OCF
NVIDIA Corp.	13.56	20.71	25.55	16.51	11.98	15.78
AMD	7.83	32.91	36.5	30.8	3.3	44.44
Intel Corp.	3.48	15.62	47.5	21.8	1.5	13.85
Cisco Systems	6.87	18.66	20.5	13.0	4.4	11.39
Broadcom	10.90	17.39	18.0	19.2	15.9	19.95
Taiwan Semiconductors	6.36	9.41	15.0	15.6	No data	11.34
Qualcomm	3.63	10.25	11.5	12.8	5.3	11.85
IBM	2.92	11.94	16.2	15.2	5.3	12.96
Arm	23.10	57.10	61.7	65.9	26.5	177.67
Sector Median	2.88	15.23	20.1	28.1	4.2	23.90

Forward Relative Valuation

Metrics	Peer Average	Peer Median	Sector Median	NVIDIA	Valuation	Median Price	Average Price
EV/Sales	8.14	6.61	2.88	11.74	Overvalued	415.09	509.09
EV/EBITDA	21.66	16.51	15.23	18.54	Overvalued	652.43	854.18
EV/EBIT	28.37	19.29	20.10	22.41	Overvalued	630.99	924.85
P/E	24.28	17.42	28.10	22.00	Undervalued	487.14	679.09
P/OCF	17.97	12.96	23.90	21.28	Overvalued	374.68	519.59

Ownership Structure			
Shareholder	Shares (in millions)	Total Position (%)	Country
The Vanguard Group	200.32	8.11%	United States
Fidelity Management & Research Company	127.83	5.18%	United States
BlackRock Institutional Trust Company	115.85	4.69%	United States
State Street Global Advisors	91.51	3.70%	United States
Jen-Hsun Huang - CEO of NVIDIA	51.39	3.51%	United States
T. Rowe Price Associates	51.39	2.08%	United States
Geode Capital Management	47.46	1.92%	United States
Norges Bank Investment Management (NBIM)	26.69	1.08%	Norway
JP Morgan Asset Management	25.64	1.04%	United States
Remaining Shares	1731.92	68.69%	-
Total Shares Outstanding	2470.00	100.00%	

Sustainalytics ESG Risk Rating Peer Analysis		
Company	ESG Risk Rating	Rank within Industry (349 constituents)
NVIDIA Corporation	14.5 Low Risk	7th
AMD	15 Low Risk	16th
Qualcomm	15.6 Low Risk	20th
IBM	14.1 Low Risk	29th
Intel Corporation	19 Low Risk	63rd
Broadcom	20 Low Risk	75th

ESG Pillar Breakdown					
Pillar	Category	FY2022	FY2021	Y/Y Change	Score Weight
Summary	ESG Score	75.31	77.04	-1.73	100%
Env.	Resource Use	83.5	88.34	-4.84	9.50%
Env.	Emissions	94.19	96.09	-1.9	9.50%
Env.	Env. Innovation	33.45	34.5	-1.05	12.10%
Social	Workforce	98.38	99.76	-1.38	10%
Social	Human Rights	57.3	65.64	-8.34	15.60%
Social	Community	66.44	84.67	-18.23	8.70%
Social	Product Responsibility	79.47	79.56	-0.09	8.70%
Gov.	Management	89.34	89.47	-0.13	17.30%
Gov.	Shareholders	82.02	50.31	31.71	5.20%
Gov.	CSR Strategy	93.6	81.09	12.51	3.50%

BOARD OF DIRECTORS								
	Name	Age	Position	Tenure	Shares (as of 31.01.23)	Total Remuneration (in $)	Audit Committee	Comp Committee	Governance Committee
	Harvey C. Jones	70	Independent Director	30	998,328	353,978		✓	✓
	Michael G. McCaffery	69	Independent Director	9	22,170	353,978	✓		
	Stephen C. Neal	74	Lead Independent Director	<1	10,154	353,978			✓
	A. Brooke Seawell	75	Independent Director	26	502,298	353,978	✓		
	Aarti Shah	58	Independent Director	3	None	353,978	✓		
	Mark A. Stevens	63	Independent Director	15	4,442,786	353,978	✓	✓	
	Robert K. Burgess	65	Independent Director	12	29,578	353,978		✓	
	Tench Coxe	65	Independent Director	30	4,185,524	353,978		✓	
	John O. Dabiri	43	Independent Director	3	2,001	353,978		✓	
	Persis S. Drell	67	Independent Director	9	43,278	353,978			✓
	Dawn Hudson	65	Independent Director	10	82,502	353,978		✓	
	Melissa Lora	61	Director	<1	None	None	✓		

✓ Chairman of Committee

✓ Committee Member

EXECUTIVE OFFICERS						
	Name	Age	Position	Tenure	Shares (as of 31.01.23)	Total Remuneration (in $)
	Jen-Hsun Huang	59	President, Chief Executive Officer, Director	31	86,878,193	21,356,924
	Colette M. Kress	55	Chief Financial Officer, Executive Vice President	10	478,297	10,917,228
	Ajay K. Puri	68	Executive Vice President - Worldwide Field Operations	15	363,780	10,627,698
	Debora Shoquist	68	Executive Vice President - Operations	15	278,224	9,115,250
	Timothy S. Teter	56	Executive Vice President, General Counsel, Secretary	6	200,050	9,107,174

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