

NVIDIA's Operating Strategy Analysis Based on Multiple Valuation Method and SWOT

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Abstract. In recent years, due to the influence of technological development, epidemic situation and international situation, the development of the semiconductor industry has both risks and opportunities. Compared with other semiconductor companies, NVIDIA's share price and corporate value are at a high level. This raises several questions: is the value of NVIDIA fair? Under such circumstances, what competitive advantages does it have and what strategic choices will it make? This paper will use two multiples valuation methods to evaluate NVIDIA. Through the SWOT method, the paper puts forward suggestions for the development of NVIDIA. The conclusion is that NVIDIA is overvalued, and the five pieces of advice are to transform the supply chain in Gaming market, tilt resources towards the data center, expand the business volume in the field of artificial intelligence and self-driving cars, open new segments and reduce overlap with strong competitors and maintain a good relationship with chip foundries. These suggestions are of certain reference significance to semiconductor enterprises with scientific and technological advantages.

Keywords: NVIDIA; multiples valuation methods; SWOT method; overvalued; suggestions.

1. Introduction

1.1 Background

Since the 1950s, the world has experienced a wave of the information revolution and gradually transitioned to the information age. The new scientific and technological revolution is marked by the breakthrough and rapid development of the electronic information industry, which mainly includes five major fields: information technology, bioengineering technology, new material technology, ocean technology and space technology. Among them, information technology is the main body. This benefits from the generation of transistors and large-scale integrated circuits, which greatly reduces the cost of information dissemination. Transistors and large-scale integrated circuits are branches of semiconductors. With the rise of the Internet and the popularity of PC, people's demand for the performance of computers has gradually increased. Higher demand for computing power and entertainment has pushed forward the transformation of integrated circuits, commonly known as chips.

Compared with the traditional industry, the semiconductor industry has a strong iterative effect. High innovation speed can often build up strong competitiveness and eliminate competitors. Intel is one example. It strictly follows Moore's Law and continuously reduces the size of transistors and increases their number to improve the performance of semiconductors. As a result, Intel established its dominant position in the PC market. However, due to physical limitations, Moore's Law has been gradually restricted. NVIDIA took this opportunity to rise out of the blue and defined the GPU chip. This move has created chips that are more suitable for AI and has also captured a large share of the PC market.

Recently, the development of semiconductor enterprises has been affected by the epidemic situation, the international situation, and other technological changes. Nevertheless, NVIDIA has a strong performance by comparison. It is higher than most of its peers in both market capitalization and share price. This gives rise to two research topics. One is whether its corporate value is fair, and the other is the kind of strategic choices NVIDIA will make in the new situation.

1.2 Objective

There are two motivations for the research. Firstly, utilize the multiples valuation method to see whether NVIDIA is over-valued, under-valued, or correctly priced. Secondly, using the SWOT method to predict NVIDIA's future strategic choices.

The framework is mainly divided into four parts. The first part is some basic descriptions of NVIDIA. This part briefly introduces the history, competitive ability, competitors, and current capability of NVIDIA. The second part analyzes NVIDIA's financial statement. It consists of NVIDIA's financial analysis and business analysis recently. The third part is marketing. It includes the basic description of NVIDIA's competitors, their comparison in the financial field, the multiples valuation, and the SWOT analysis of NVIDIA. The last part gives suggestions for NVIDIA. It is also the prediction of NVIDIA's future strategic options. This section combines all the previous analyses and puts forward five suggestions.

2. Basic Descriptions of NVIDIA

NVIDIA is a semiconductor company founded in 1933. It was publicly listed on National Association of Securities Deal Automated Quotations (NASDAQ) in 1996. The company is headquartered in Santa Clara, California, USA. In order to expand its business, it has set up offices all over the world. NVIDIA attaches great importance to innovation. As of January 30, 2022, NVIDIA had 22, 473 employees globally, 72% of which were engaged in research and development.

NVIDIA is the global pioneer in programmable graphics processing technology. In 1999, it defined GPU, introduce it to the production line and reinvented the whole industry. It's designed GPU has outstanding performance, which not only provides vivid visual effects but also enables users to get an excellent interactive experience with professional computing platforms. In recent years, it has successively come out with DPU and CPU chips, expanding the product layout.

The significant events of NVIDIA since 1999 are shown in the following table.

Table 1. Significant Events of NVIDIA Since 1999 [1]

Year	Events
1999	NVIDIA defined GPU.
2001	NVIDIA introduced NFORCE, entering the Built-in Graphics Market.
2003	NVIDIA acquired MediaQ, a leader in graphics and wireless multimedia technologies.
2006	NVIDIA unveiled CUDA architecture, a revolutionary architecture for general-purpose computing.
2008	NVIDIA acquired AGEIA, a developer of gaming physics technology.
2009	NVIDIA announced Fermi Architecture at the first time at GPU Technology Conference.
2010	NVIDIA introduced world's fastest supercomputer.
2012	First virtualized GPU is unveiled.
2016	NVIDIA led the AI revolution with PASCAL, DGX-1, DRIVE PX 2.
2017	NVIDIA furthered modern AI with GPU deep learning, VOLTA.
2019	NVIDIA announced advances across HPC, Embedded, Data Center, Self-Driving, and PRO graphics markets.
2020	NVIDIA acquired MELLANOX, expanded its product layout to DPU.
2021	Unveiled Grace, a CPU specially designed for giant AI and high-performance workloads.

As can be seen from Table 1 above, NVIDIA has never stopped the pace of innovation. It continuously acquires companies with technical expertise and introduces new products and structures to enhance its competitiveness. Meanwhile, it expands its market scope step by step. It started with making 3D graphics cards with good performance, and gradually became a giant in PC market, gaining a place in the Gaming market. Then in 2001, its CUDA architecture made it expand to scientific computing. In 2016, it introduced the first three products for autonomous driving and AI. Today, NVIDIA's platforms address four large markets: Gaming, Data Center, Professional Visualization, and Automotive.

The breadth of business also means the diversity of competitors. According to NVIDIA's 10-K financial report of 2022, a significant source of competition comes from companies that provide or intend to provide GPUs, embedded SoCs, and other accelerated, AI computing processor products, and providers of semiconductor-based high-performance interconnect products based on InfiniBand, Ethernet, Fibre Channel, and proprietary technologies [2]. Up to now, the discrete graphics market is in the oligopoly competition between NVIDIA and Advanced Micro Devices (AMD). Yet from the perspective of global GPU share, Intel has an overwhelming advantage. In the field of automotive chips, Qualcomm, Intel, Google, Amazon, and other companies have also made efforts. However, the strength of NVIDIA should not be underestimated. In 2020, NVIDIA overtook Intel for the first time as the American chip maker with the highest market capitalization. In May 2022, according to the Global Top 100 Companies-by-Market Capitalization report from PricewaterhouseCoopers (PwC), NVIDIA ranked 8th in market capitalization [3]. It was also the company with the second-largest relative increases in market capitalization.

Is the company overvalued compared to its competitors? What is the competitive advantage of NVIDIA? Based on the multiple valuation methods, this paper will conduct a valuation of NVIDIA and analyze the competitive advantages of NVIDIA by comparing it with its competitors.

3. Financial Statement Analysis

3.1 Financial Analysis

Table 2 illustrates that the revenue, gross profit, total operating profit/loss, and net income of NVIDIA have all shown an upward trend in the past five years. Although they declined by 6.81%, 5.62%, 25.18% and 32.48% respectively in 2020, they recover rapidly with an accelerating growth rate. In 2021, all four grew by more than 50%. In 2022, revenue and gross profit increased by more than 60%, while total operating profit/loss and net income increased by more than 120%.

Table 2. Past 5 Years Income-Statement of NVIDIA [2]

(Fiscal Years ends in Jan 31)	2018	2019	2020	2021	2022
Revenue(mil)	9714.	11716.	10918.	16675.	26914.
Cost of Revenue(mil)	3892.	4545.	4150.	6279.	9439.
Gross Profit(mil)	5822.	7171.	6768.	10396.	17475.
G&A Expenses(mil)	815.	991.	1093.	1940.	2166.
R&D Expenses(mil)	1797.	2376.	2829.	3924.	5268.
Operating Expenses(mil)	2612.	3367.	3922.	5864.	7434.
Operating Profit/Loss(mil)	3210.	3804.	2846.	4532.	10041.
Net Income(mil)	3047.	4141.	2796.	4332.	9752.
Net Margin	31.37%	35.34%	25.61%	25.98%	36.23%

Table 3. Past 5 Quarters Income-Statement of NVIDIA [2]

	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	TTM
Revenue(mil)	6507.	7103.	7643.	8288.	6704.	29738.
Cost of Revenue(mil)	2292.	2472.	2644.	2857.	3789.	11762.
Gross Profit(mil)	4215.	4631.	4999.	5431.	2915.	17976.
G&A Expenses(mil)	526.	557.	563.	592.	592.	2303.
R&D Expenses(mil)	1245.	1403.	1466.	1618.	1824.	6312.
Operating Expenses(mil)	1771.	1960.	2029.	2210.	2416.	8615.
Operating Profit/Loss(mil)	2444.	2671.	2970.	3221.	499.	9361.
Net Income(mil)	2374.	2464.	3003.	1618.	656.	7741.
Net Margin	36.48%	34.69%	39.29%	19.52%	9.79%	26.03%

Table 3 below displays that, the revenue, gross profit, and operating profit/loss of NVIDIA kept rising until peaked in the first quarter of fiscal year 2023(FY2023), but decreased in the second quarter of FY2023. The net income began to decline in the first quarter of FY2023 and the downward trend continued into the second quarter.

In the first quarter of FY2023, NVIDIA failed to acquire ARM, and the loss of 1353 million dollars was reflected in Net Income. This was the main reason for the non-compliance between gross profit and net income in the first quarter of FY2023. Therefore, the decrease in net income does not represent the poor operation in the first quarter of FY2023. However, in the second quarter of FY2023, NVIDIA's operating profit/loss, gross profit and net income decreased simultaneously, indicating that NVIDIA suffered a certain impact in the second quarter of FY2023.

However, regardless of the operating conditions, NVIDIA has always been able to make a profit. In the past five quarters, its highest net margin was 39.29% while the lowest one was 9.79%. The net margin for Trailing Twelve Months was 26.03%, which showed its good profitability. Its research and development costs have also been on the rise.

Also, NVIDIA's earnings have grown significantly by 25% per year over the past 5 years. This demonstrates the good development ability of NVIDIA.

Moreover, NVIDIA has good solvency. As shown in Figure 1, NVIDIA's debt-to-equity ratio has increased from 34.6% to 45.9% over the past 5 years. Yet the company has more cash than its total debt, and its debt is well covered by operating cash flow. Its interest payments on its debt are also well covered by EBIT.



Fig. 1 Debt to Equity History of NVIDIA [4]

3.2 Business Analysis

NVIDIA has two segments: Graphics segment and Computer&Networking segment, and four main business targets: Gaming, Data Center, Professional Visualization and Automotive. Gaming was originally NVIDIA's main revenue source. However, starting from the first quarter of FY2020, only Data Center's revenue has been growing, while the revenues of other businesses always fluctuate. In the second quarter of FY2021 and the first and second quarters of FY2023, Data Center overtook Gaming as the new major revenue source. Although revenue from Gaming continued to grow until the first quarter of FY2023, the growth rate was lower than that of the data center business. As can be seen from Figure 2, the decrease in total revenue in the second quarter of FY2023 was due to the weakness of the Gaming market.

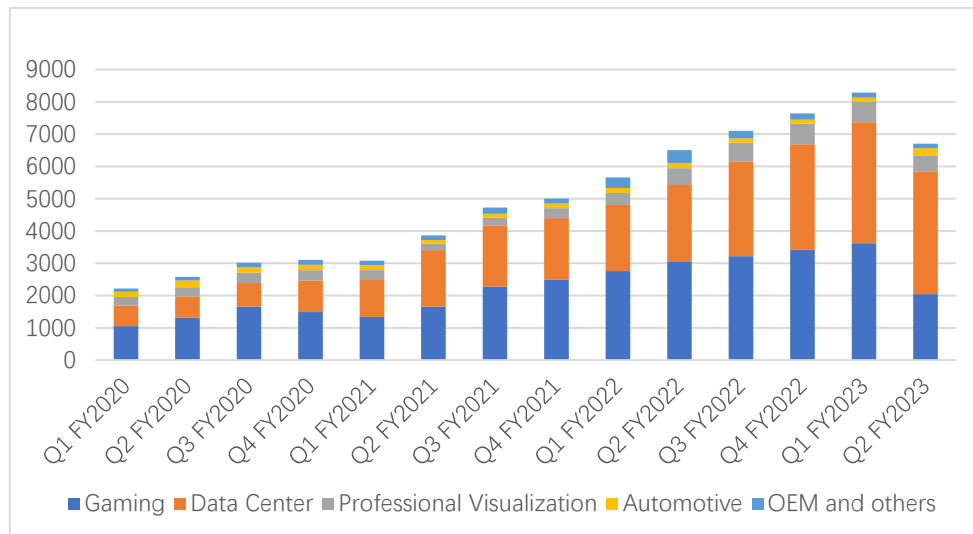


Fig. 2 NVIDIA Revenue Trend-Revenue by Markets [2]

4. Marketing

4.1 Competitors Analysis

From PwC’s report, as of March 31, 2022, the top five U. S. semiconductor companies are NVIDIA Corp, Broadcom Inc, Intel Corp, Advanced Micro Devices (AMD) and Qualcomm. Their high market capitalization (more than 10 billion) reflects that they are all large-cap companies [5]. Large-cap companies are major players in well-established industries, which means that the five have stronger competitiveness than those with lower market capitalization. Also, their business targets are overlapped with each other’s. Therefore, the other four companies are selected as NVIDIA’s main competitors.

The detailed descriptions of the competitors are as follows.

4.1.1 Broadcom

Broadcom is the world's leading wired and wireless communications semiconductor company, and one of the undisputed leaders in the Ethernet NIC controller market. It supplies Soc products, interconnect, switches, and cable solutions. Its revenue is divided into two segments: Semiconductor Solutions and Infrastructure Software. In the second quarter of FY2022, Semiconductor Solutions accounted for 77% of revenue. Data Center is a part of Semiconductor Solutions. In 2021, Broadcom was on par with NVIDIA, Intel, Xilinx and Pensando in the design of SmartNIC around FPGA platform. On May 26, 2022, Broadcom announced the acquisition of cloud service provider VMware, further improving its competitiveness in cloud data centers.

4.1.2 Intel

Intel has six main businesses: Client Computing Group (CCG), Data Center and AI Group (DCAI), Network and Edge Group (NEX), Accelerated Computing Systems and Graphics Group (AXG), Mobileye and Intel Foundry Services (IFS). Among them, CCG and DCAI are the top two revenue sources of Intel. Intel is a CPU giant and also holds a major share in the integrated GPU market. According to Jon Peddie Research, Intel has not made significant achievements in discrete graphics [6]. However, Intel has been researching discrete graphics cards for nearly two years, and the Arc series is a high-end discrete graphics card with a cheaper price than NVIDIA’s. In terms of DPU, Intel has been improving its competitiveness. In 2022, Intel announced the acquisition of Grand. The acquisition will expand Intel's market share in the DPU and enhance its competitiveness in the DCAI business. Like NVIDIA, Intel is gradually moving from PC-centric to Data Center-centric.

4.1.3 AMD

AMD has four main businesses: Client, Gaming, Data Center and Embedded, among which Client is the main source of revenue. AMD is NVIDIA's strongest competitor in the discrete graphics market. It is also another big chip design company of CPU, further squeezing the CPU market of NVIDIA. In terms of DPU, AMD is also improving its competitiveness. In the first quarter of FY2022, NVIDIA acquired the FBGA platform giant Xilinx. Then the acquisition of the DPU supplier, Pensando, added another boost to its Data Center business.

4.1.4 Qualcomm

Qualcomm is one of the leaders of Soc products. It has four main businesses: Handsets, RF front-end, Automotive and IoT. Although its main business is Handset, it is on par with NVIDIA in Automotive. After NVIDIA released Thor, an automotive chip with a 2000 TOPS computing power, Qualcomm launched the industry's first integrated car supercomputer Soc. The product named Snapdragon Ride Flex also has a maximum computing power of 2000 TOPS. The product's biggest goal is the same as Thor's: to achieve in-car central computing.

4.2 Financial Comparison

The comparison in the following table consistently uses the GAAP financial results for the Trailing Twelve Months, except for the Growth Part and the Financial Health part. The Growth Part uses the financial data from the past three years. The Financial Health part used the data from companies' latest quarterly financial report. In Table 4, the red number indicates that it is the largest while the green number indicates the smallest of the indicators.

Table 4. Financial Comparison of Companies [7]

	Companies	NVIDIA	Broadcom	Intel	AMD	Qualcomm
Operating and Efficiency	Revenue (Bil)	29.74	31.68	69.54	22.83	44.20
	Gross Margin	60.45%	65.68%	46.50%	50.95%	57.84%
	Net Income(Bil)	7.74	9.83	13.30	2.27	12.94
	Net Margin	26.03%	31.02%	19.93%	9.96%	29.27%
	ROE	34.41%	43.46%	14.00%	7.37%	92.52%
Growth	Rev 3-Yr Growth	31.95%	9.60%	3.71%	36.41%	22.11%
	Net Income 3-Yr Growth	33.04%	-18.90%	-1.91%	110.92%	43.41%
Financial Health	Debt/Equity Ratio	0.44	1.88	0.37	0.05	0.75
	Financial Leverage	1.82	3.42	1.75	1.66	2.72
R&D Capability	R&D/Revenue	21.23%	15.54%	24.61%	19.49%	18.54%

Judging from Table 4, Intel has had the highest revenue and net income in the past 12 months. However, its revenue growth has been the slowest in the past three years, and its net income has also recorded negative growth. Broadcom has the highest gross profit margin and net profit margin, but its net income growth rate in the last three years is negative and the smallest. Moreover, its debt-to-equity ratio and financial leverage are the largest, which means that it is also facing great financial risks. Although the growth rates of AMD are outstanding, its overall capacity in operating and efficiency is weaker than others. As for Qualcomm, on the one hand, its Return on Equity exceeded 90%, reflecting its high actual distributable profits. On the other hand, its debt-to-equity ratio exceeded the 70% risk-control-line. Additionally, its financial leverage was the second largest. These two appearances indicate that it also has considerable financial risks. On the whole, although NVIDIA is not the apex in the indicators, it has a strong comprehensive performance. In the Operating and Efficiency part, both of NVIDIA's profit margins are above average. Its revenue and net income are slightly insufficient, but its growth rates are both more than 30%, which shows its development

potential. At the same time, NVIDIA's debt-equity ratio and financial leverage are kept at a reasonable level, which implies that it has less risk while it can obtain higher revenue.

According to the 2022 SIA Factbook, R&D Expenditures as a Percent of Sales of American semiconductor industry was 18% [8]. Only Broadcom's is under this level. The ratio of NVIDIA ranks second, showing its strong R&D competitiveness.

4.3 Multiples Valuation

There are two types of valuation multiples: enterprise value multiple and equity multiple [9].

Multiples of enterprise value are industry-specific, consisting of the ratio of enterprise value to sales, EV/EBITDA ratio and EV/EBIT ratio. (EBITDA represents income before interest, tax, depreciation and amortization, and EBIT represents earnings before interest and tax). Multiples of equity are related to a specific life cycle, including the ratio between a company's share price and one of the elements to underline company performance. Common multiples of equity include the price-to-sale (P/S) ratio, price-to-cash flow (P/CF) ratio, price-to-book ratio, price-to-earning (P/E) ratio, and price-to-earnings ratio to growth (PEG) ratio.

This paper will adopt two multiples for NVIDIA's valuation, among which EV/EBITDA is applied to enterprise value multiple methods, while P/S ratio, P/CF ratio, P/E ratio and PEG ratio are applied to equity multiple methods.

Table 5. The Multiples Indicators of the Companies [7]

Company	EV/EBITDA	P/S	P/CF	P/E	PEG
NVIDIA	37.1	12.06	47.48	46.26	2.64
Broadcom	12.10	6.37	12.85	20.09	0.73
Intel	4.93	1.67	8.49	8.73	14.71
AMD	37.57	4.01	23.96	38.15	1.01
Qualcomm	7.46	2.74	13.34	9.35	0.89
Peers	15.52	3.70	14.66	19.08	4.34

Table 5 reflects that except PEG ratio, NVIDIA's indicators are larger than the peers' average. Judging from these indicators, the value of NVIDIA is overestimated. Besides, although NVIDIA's PEG ratio is smaller than its peers' average, its PEG ratio is larger than 1, which also belongs to the recognized overvalued category. So, it can be concluded that, compared with its competitive peers, NVIDIA is overestimated.

4.4 SWOT Analyst

4.4.1 strengths

Technological edge. Firstly, NVIDIA has strong technological capital. After 29 years of development, NVIDIA has accumulated a lot of technical experience in the field of discrete graphics. According to the evaluation of Expreview, its GPUs are always in the leading position [10]. After Intel entered the discrete graphics market, NVIDIA's status remained unchanged in terms of market share and performance [6]. Figure 3 shows that in the last three quarters, NVIDIA's share in the discrete graphics market has remained above 70%. In the second quarter of 2022, when sales volume in the PC chip market fell (detailed analysis will be made in Threats), NVIDIA's share of discrete graphics cards even increased. Figure 4 is the performance ranking of Expreview for the discrete GPUs manufactured from 2021 to 2022. In the figure, the green ones are NVIDIA's products, the red ones are AMD's and the blue ones are Intel's. It can be concluded that NVIDIA's average GPU performance is higher than that of its rivals. Besides, NVIDIA has acquired many companies with technical expertise and expanded its knowledge scope. For example, with the acquisition of Mellanox, NVIDIA strengthened its end-to-end expertise in data center architectures, which enables NVIDIA to deliver performance advantages to target markets. Secondly, NVIDIA's innovation speed is faster than that of its competitors. In its R&D history, it has given priority to defining many products and

architectures, such as CUDA. These technologies are then learned by competitors, thus promoting the reform of the whole industry. In technology, NVIDIA always leads the way.

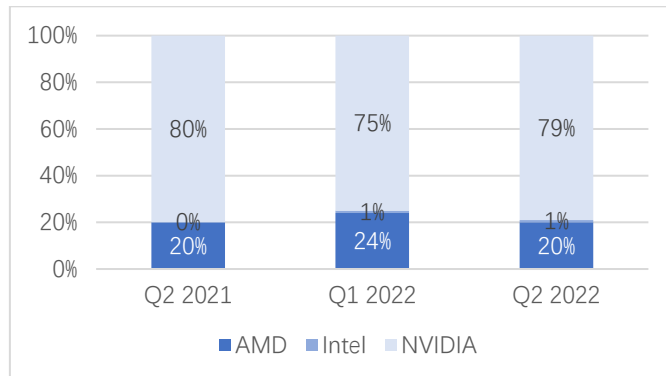


Fig. 3 Discrete GPU Market Share [6]

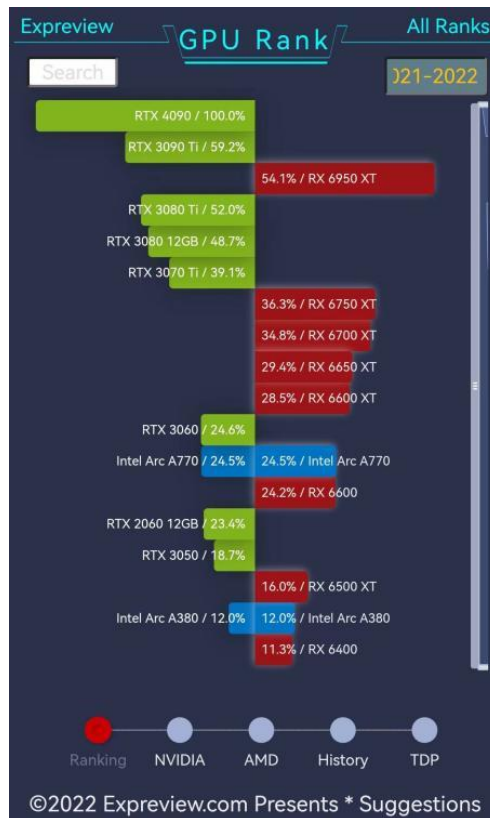


Fig. 4 Discrete GPU Performance Rank [10]

Financial advantage. The analysis in 4.1.2 has demonstrated NVIDIA’s good comprehensive capabilities. This is also the foundation of NVIDIA's ability to acquire companies with technical expertise and to increase research and development investment year by year.

Business strength. Diversification of the business disperses risks and increases revenue. For example, the steady growth of the data center in recent years has not only increased the revenue sources but also neutralized the risks brought by the unstable revenue of Gaming, the former main business.

Advantages in manufacturing strategy. NVIDIA is a fabless company. By outsourcing manufacturing processes to certified foundries, NVIDIA not only avoids many significant costs and risks associated with owning and operating a manufacturing business, but also focuses resources on product design, additional quality assurance, marketing, and customer support.

4.4.2 weaknesses

NVIDIA has a high product cost, which has reflected in its product price. Its competitors can produce chips that are cheaper but still perform well enough to meet consumer demand. These have strong substitutes for its products. Meanwhile, NVIDIA's operating costs have been on the rise. As shown in Figure 5, the operating costs increases by more than 15% every year for the past four years. Operating costs may compress the profit margin when NVIDIA's revenue decreases due to external economic, political, social, market, or industry changes. It may also result in layoffs.

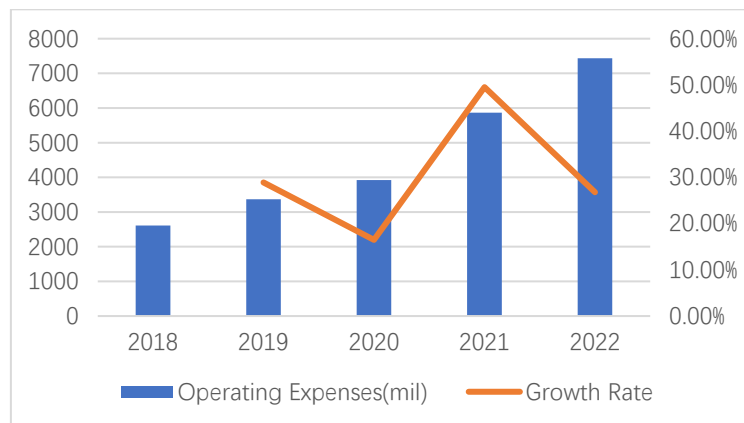


Fig. 5 Operating Expenses and its Growth Rate [2]

4.4.3 opportunities

Strong GPU market. Moore's Law states that the development of chip technology will double the number of transistors in about 24 months. Due to the limitations of semiconductor physics, the progress of technology has gradually been in a dilemma. The improvement of CPU performance today has been difficult to meet Moore's Law. However, the invention of GPU has opened a new path, which can greatly improve the level of computing. At the same time, the expansion of GPU applications has opened more markets for it. The emergence of artificial intelligence and auto-driving technology plays a role in promoting it. Compared with CPU, GPU is more suitable for artificial intelligence neural networks. It is also more able to meet the performance requirements of autonomous vehicles [11]. Besides, GPU is inherently more energy-efficient than other forms of computing. This meets the requirements for energy conservation in the context of climate change.

Huge demand for DPU in the global market. According to third-party estimates, the global data center accelerator market could be worth \$53 billion by 2027 compared to just \$4.2 billion in 2020, clocking a compound annual growth rate (CAGR) of nearly 44% [12]. Graphics processing units (GPUs) and field-programmable gate arrays (FPGAs) are expected to corner almost \$39 billion of the overall data center accelerator market, which means that DPUs and central processing units (CPUs) are likely to compete for the remaining opportunity.

Great development potential in automobile chips. Under the weak economic situation, companies such as Texas Instruments, Infineon, and ADI all indicated that the market demand for automotive chips is still very strong [13]. As for the automotive business, NVIDIA has more than 200 industry-wide partners [14].

Policy Support. According to CHIPS and Science Act of 2022, the United States' government will invest 52.7 billion dollars in total for chip manufacturing and research [15]. Companies in the semiconductor industry can take advantage of incentives and the new 25% tax credit to further their research and development.

4.4.4 threat

The global economy is weak. The COVID-19 epidemic and the Russo-Ukrainian war have led to slow global economic development. In response to high inflation, the FRB's move to raise interest

rates will suppress demand for investment in corporate production. This will affect the future production capacity of the enterprise.

The restriction of laws and regulations. Due to American emphasis on anti-monopoly, NVIDIA's acquisition will face many obstacles. The restrictions on exports imposed by trade policies will reduce NVIDIA's income sources, and will also affect NVIDIA's communication with employees in restricted areas.

The gloomy industry situation. According to Gartner's report, global PC shipments fell 19.5% year-on-year in the third quarter of 2022, the largest drop in more than 20 years [13]. This has led to a backlog of inventory at Gaming.

Intense competition. As NVIDIA expands its business scope, its competitors are doing the same. All of them have taken measures to acquire relevant companies or develop new products to enhance their business competitiveness. In 2022, for example, NVIDIA, AMD and Intel successively acquired companies for Data Center development.

5. Suggestion

Based on the above analysis, this section puts forward the following five suggestions for NVIDIA.

Transform the supply chain in Gaming market. Due to the decline in demand, the semiconductor market for consumer electronics applications has dropped significantly in recent quarters, which is predicted to have remained. To reduce the future backlog, NVIDIA needs to transform its supply chain. For example, negotiate with game players and take action to adjust channel prices and inventory.

Tilt resources toward the data center. The revenue of the data center grows every year, and it has become the main business of NVIDIA's. Through acquisition and R&D, NVIDIA has accumulated certain technical advantages in the data center market. The market demand for DPU also reflects the bright future of the data market. Therefore, NVIDIA can adjust the allocation of financial and R&D resources to some extent, and tilt to the data center business.

Expand the business volume in the field of artificial intelligence and self-driving cars. Intelligent and self-driving cars have high adaptability to GPU, and the two emerging technologies still have a large market space, which requires high-performance chips. NVIDIA has a strong customer industry chain and technical advantages, but its revenue in Automotive accounts for only about 2%. Therefore, we can expand the business volume in these two aspects and tap the potential value of GPU.

Open new segments and reduce overlap with strong competitors. AMD and Intel are oligopolistic in the x86 CPU market, occupying almost all the market share. Therefore, NVIDIA's GPU should avoid entering the x86 market and open the CPU market for emerging technologies such as AI.

Maintain a good relationship with chip foundries. A fabless manufacturing strategy can concentrate more economic and technical resources than competitors adopting IDM mode. Yet it also means a strong dependence on foundries. Therefore, a sustainable supply relationship should be established with foundries. For example, some inventory orders that cannot be canceled are signed in advance, and a good credit level is maintained to ensure future supply and production capacity. Therefore, we should establish a sustainable supply relationship with Foundries. For example, sign non-cancellable inventory orders in advance. It helps maintain a good credit level to ensure future supply and production capacity.

6. Conclusion

Under the new situation of the comprehensive influence of science and technology, the economy and society, the semiconductor industry has mixed feelings. However, NVIDIA has always maintained a high level in terms of market value and share price. This has given rise to a study of the valuation of NVIDIA as well as a study of its strategic choices. The preceding paragraphs first make a vertical analysis of the situation of NVIDIA itself and make a horizontal comparison with its

competitors. Then determines NVIDIA is overestimated by multiples valuation methods. At last applies the SWOT analysis, recommending NVIDIA to transform the supply chain in Gaming market, tilt resources towards the data center, expand the business volume in the field of artificial intelligence and self-driving cars, open up new segments and reduce overlap with strong competitors and maintain a good relationship with chip foundries. For companies with expertise in science and technology, it is of certain reference significance.

References

- [1] NVIDIA history. Retrieved on November 7, 2022. Retrieved from: <https://www.nvidia.com/zh-tw/about-nvidia/corporate-timeline/>
- [2] Financial Reports. Retrieved on November 7, 2022. Retrieved from: <https://investor.nvidia.com/financial-info/financial-reports/default.aspx>
- [3] PricewaterhouseCoopers. Global ranking of the top 100 public companies by market capitalisation. May 31, 2022. Retrieved on November 7, 2022. Retrieved from: <https://www.pwc.com/gx/en/services/audit-assurance/publications/global-top-100-companies.html>
- [4] NVIDIA(NasdaqGS: NVDA) Stock Report. Retrieved on November 7, 2022. Retrieved from: <https://simplywall.st/stocks/us/semiconductors/nasdaq-nvda/nvidia#health>
- [5] Jason Fernando. Market Capitalization: How Is It Calculated and What Does It Tell Investors. August 10, 2022. Retrieved on November 7, 2022. Retrieved from: <https://www.investopedia.com/terms/m/marketcapitalization.asp>
- [6] Jiajian Lyu. Despite a significant drop in revenue from its gaming business, NVIDIA's 2022Q2 discrete graphics market share has increased. September 5, 2022. Retrieved on November 7, 2022. Retrieved from: <https://m.expreview.com/84724.html>
- [8] Morningstar Rating. NVIDIA Corp NVDA Stock Quote | Rating as of Nov 6, 2022. November 7, 2022. Retrieved on November 7, 2022. Retrieved from: <https://www.morningstar.com/stocks/xnas/nvda/quote>
- [9] Sarah Ravi. 2022 Factbook - Semiconductor Industry Association. Apr 21, 2022. Retrieved on November 7, 2022. Retrieved from: <https://www.semiconductors.org/resources/factbook/>
- [10] Jingyi Li. Value Evaluation of MicroStrategy. In: 2nd International Conference on the Frontiers of Innovative Economics and Management (FIEM 2021). Hangzhou, China. pp. 14-21. 2021.
- [11] GPU Rank. 2022. Retrieved on November 7, 2022. Retrieved from: <https://topic.expreview.com/GPU/#>
- [12] Toru Baji. GPU: the biggest key processor for AI and parallel processing. In: Proceedings Volume Photomask Japan 2017: XXIV Symposium on Photomask and Next-Generation Lithography Mask Technology. Yokohama, Japan. Vol. 10454, pp. 24-29. 2017.
- [13] Harsh Chauhan. How NVIDIA Is Ensuring the Sustained Growth of Its Data Center Business. July 17, 2021. Retrieved on November 7, 2022. Retrieved from: <https://www.fool.com/investing/2021/07/17/how-nvidia-is-ensuring-sustained-growth-of-its-dat/>
- [14] Semiconductor Industry Observation. The Future of Semiconductor Industry in the Eyes of Giant. October 31, 2022. Retrieved on November 7, 2022. Retrieved from: <https://mq.mbd.baidu.com/r/PMoFLWYvu?f=cp&u=c3acd11fa988f037>
- [15] Autobot Reference. Comprehensive analysis of NVIDIA (I). March 7, 2022. Retrieved on November 7, 2022. Retrieved from: <https://my.mbd.baidu.com/r/PMs43OExFe?f=cp&u=86bc537ac2b722e7>
- [16] Katie Lobosco. Here's what's in the bipartisan semiconductor chip manufacturing package. August 9, 2022. Retrieved on November 7, 2022. Retrieved from: <https://edition.cnn.com/2022/08/09/politics/chips-semiconductor-manufacturing-science-act/index.html>