NVIDIA Corporation

Generational opportunity, strengthening position, raise est/PO to $190

Reiterate Rating: BUY | PO: 190.00 USD | Price: 137.95 USD

Further strengthening competitive landscape, PO $190

We reiterate our Buy rating, raise our CY25/26 pf-EPS est. by 13%-20%, and lift our PO to $190 from $165 (unch. CY25E 42x PE) on top AI pick NVDA. Our confidence in NVDA's competitive lead (80-85% mkt. share) and generational opportunity ($400bn+ TAM, 4x+ vs. CY24) is boosted by: (1) recent industry events (TSMC results, AMD AI event, our meetings with AVGO, MU, optical experts, launch pace of large language models, capex commentary from top hyperscalers and NVDA mgt. re "insane Blackwell demand"); (2) NVDA's underappreciated enterprise partnerships (Accenture, ServiceNow, Oracle, etc.) and software offerings (NIMs); and (3) ability to generate $200bn in FCF over the next two years. Meanwhile, in our view, NVDA's valuation remains compelling at just 0.6x CY25E PE to YoY EPS growth-rate or PEG, well below "Mag-7" avg. of 1.9x. Data from the BofA strategy team suggests NVDA is broadly owned but only ~1x mkt. weighted in active portfolios.

Bull case: 15-20% networking mix, Blackwell yield improv.

Given the continued strong demand outlook in AI/LLM and increased CoWoS/HBM supply visibility (see pg. 5), we raise NVDA FY26/27 (CY25/26) pf-EPS estimates to $4.47/$5.67. However, our Networking assumptions are conservative at just 14% DC mix in FY26/27 vs. 15-20% historically. A faster ramp of its Spectrum switch (transitions to 100k+ clusters) and potential share gain in Ethernet could increase mix toward 17-18% again, resulting in $200bn+ FY26E sales conceptually. We also note upside to our FY26E 73.7% GM toward mid-70s %, driven by: (1) a mix shift toward systems (higher premium); or (2) better Blackwell yield. Combined, NVDA could see scenario FY26 EPS of $5+ (vs. consensus' $4.06).

Enterprise: growing role of AI, broadening engagements

We also highlight a growing presence of AI in enterprise, where NVDA is the partner of choice (more on pg. 10). NVDA's engagements span multiple verticals (e.g., Accenture, ServiceNow, Microsoft), and offerings such as AI Foundry, AI Hubs, NIMs are key levers to its AI leadership, not only on the hardware side but also on systems/ecosystems side.

$200bn+ of FCF generation next 2 yrs = growth options

We note NVDA's underappreciated FCF generation at 45-50%+ margin, nearly double that of the Mag-7 avg 23-25%. In $ terms, NVDA could take in $200bn+ of FCF over the next two years, rivaling that of AAPL and providing growth optionality.

Estimates (Jan) (US$)	2023A	2024A	2025E	2026E	2027E
EPS	0.33	1.30	2.87	4.47	5.67
GAAP EPS	0.17	1.19	2.73	4.22	5.39
EPS Change (YoY)	-25.0%	293.9%	120.8%	55.7%	26.8%
Consensus EPS (Bloomberg)			2.83	4.06	NA
DPS	0.02	0.02	0.02	0.02	0.02
Valuation (Jan)					
P/E	418.4x	106.2x	48.1x	30.9x	24.4x
GAAP P/E	812.2x	116.0x	50.6x	32.7x	25.6x
EV / EBITDA*	324.3x	88.8x	40.0x	25.9x	20.9x
Free Cash Flow Yield*	0.1%	0.8%	1.8%	2.7%	3.7%

* For full definitions of *IQmethod*℠ measures, see page 17.

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Refer to important disclosures on page 18 to 20. Analyst Certification on page 16. Price Objective Basis/Risk on page 15.   12750145

Timestamp: 17 October 2024 04:15PM EDT

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17 October 2024

Equity

Key Changes

(US$)	Previous	Current
Price Obj.	165.00	190.00
2025E Rev (m)	123,895.8	126,217.4
2026E Rev (m)	171,344.3	194,430.7
2027E Rev (m)	201,064.9	237,877.1
2025E EPS	2.81	2.87
2026E EPS	3.90	4.47
2027E EPS	4.72	5.67

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Stock Data

Price	137.95 USD
Price Objective	190.00 USD
Date Established	14-Oct-2024
Investment Opinion	C-1-7
52-Week Range	39.23 USD - 140.76 USD
Mrkt Val (mn) / Shares Out (mn)	3,432,196 USD / 24,880.0
Free Float	96.1%
Average Daily Value (mn)	40198.37 USD
BofA Ticker / Exchange	NVDA / NAS
Bloomberg / Reuters	NVDA US / NVDA.OQ
ROE (2025E)	113.1%
Net Dbt to Eqty (Jan-2024A)	5.7%

See page 15 for a Glossary of industry terminology used in the report.

iQprofile^{SM} NVIDIA Corporation

*iQ*method^{SM} **– Bus Performance***

(US$ Millions)	2023A	2024A	2025E	2026E	2027E
Return on Capital Employed	21.5%	70.9%	93.4%	79.1%	58.4%
Return on Equity	34.3%	99.3%	113.1%	88.6%	62.6%
Operating Margin	33.5%	61.0%	66.5%	66.2%	67.1%
Free Cash Flow	3,809	27,023	61,592	93,203	128,044

*iQ*method^{SM} **– Quality of Earnings***

(US$ Millions)	2023A	2024A	2025E	2026E	2027E
Cash Realization Ratio	0.7x	0.9x	0.9x	0.9x	1.0x
Asset Replacement Ratio	1.2x	0.7x	2.0x	1.3x	1.3x
Tax Rate	NM	12.0%	15.5%	17.0%	17.0%
Net Debt-to-Equity Ratio	34.2%	5.7%	-8.7%	-30.0%	-46.7%
Interest Cover	NA	NA	NA	NA	NA

Income Statement Data (Jan)

(US$ Millions)	2023A	2024A	2025E	2026E	2027E
Sales	26,974	60,922	126,217	194,431	237,877
% Change	0.2%	125.9%	107.2%	54.0%	22.3%
Gross Profit	15,965	44,958	95,330	143,342	177,658
% Change	-11.1%	181.6%	112.0%	50.4%	23.9%
EBITDA	10,584	38,642	85,845	132,608	164,416
% Change	-23.7%	265.1%	122.2%	54.5%	24.0%
Net Interest & Other Income	6	611	1,384	1,604	1,804
Net Income (Adjusted)	**8,366**	**32,312**	**70,949**	**108,169**	**134,014**
% Change	**-25.7%**	**286.2%**	**119.6%**	**52.5%**	**23.9%**

Free Cash Flow Data (Jan)

(US$ Millions)	2023A	2024A	2025E	2026E	2027E
Net Income from Cont Operations (GAAP)	4,368	29,759	67,632	102,099	127,337
Depreciation & Amortization	1,544	1,508	1,854	3,889	4,758
Change in Working Capital	(2,206)	(3,722)	(5,303)	(13,957)	(4,577)
Deferred Taxation Charge	(2,164)	(2,488)	(3,276)	0	0
Other Adjustments, Net	4,100	3,034	4,311	6,032	6,473
Capital Expenditure	(1,833)	(1,068)	(3,627)	(4,861)	(5,947)
Free Cash Flow	**3,809**	**27,023**	**61,592**	**93,203**	**128,044**
% Change	**-53.2%**	**609.5%**	**127.9%**	**51.3%**	**37.4%**
Share / Issue Repurchase	(9,685)	(9,130)	(28,929)	(28,632)	(28,632)
Cost of Dividends Paid	(398)	(396)	(542)	(390)	(380)
Change in Debt	(22)	(1,279)	(1,250)	0	0

Balance Sheet Data (Jan)

(US$ Millions)	2023A	2024A	2025E	2026E	2027E
Cash & Equivalents	3,389	7,280	15,673	56,878	132,933
Trade Receivables	3,827	9,999	17,530	26,552	29,546
Other Current Assets	15,857	27,066	50,819	80,308	105,378
Property, Plant & Equipment	3,807	3,914	6,155	7,127	8,317
Other Non-Current Assets	14,302	17,469	20,709	20,709	20,709
Total Assets	**41,182**	**65,728**	**110,886**	**191,574**	**296,883**
Short-Term Debt	1,250	1,250	0	0	0
Other Current Liabilities	5,313	9,381	15,293	16,871	17,382
Long-Term Debt	9,703	8,459	8,461	8,461	8,461
Other Non-Current Liabilities	2,815	3,660	4,640	4,640	4,640
Total Liabilities	**19,081**	**22,750**	**28,394**	**29,972**	**30,483**
Total Equity	**22,101**	**42,978**	**82,492**	**161,602**	**266,400**
Total Equity & Liabilities	**41,182**	**65,728**	**110,886**	**191,574**	**296,883**

* For full definitions of *iQ*method^{SM} measures, see page 17.

Company Sector

Semiconductors

Company Description

Nvidia designs and sell graphics and video processing chips for desktop and notebook gaming PCs, workstations, game consoles, and accelerated computing servers and supercomputers.

Investment Rationale

Our positive view on Nvidia is based on its underappreciated transformation from a traditional PC graphics chip vendor, into a supplier into high-end gaming, enterprise graphics, cloud, accelerated computing and automotive markets. The company has executed consistently and has a solid balance sheet with demonstrated commitment to capital returns.

Stock Data

Average Daily Volume	291,398,112

Quarterly Earnings Estimates

	2024	2025
Q1	0.11A	0.61A
Q2	0.27A	0.68A
Q3	0.40A	0.74E
Q4	0.52A	0.83E

Contents

Summary of recent industry events

Below, we provide a summary of AI-related events over the last few weeks that have increased our confidence in NVDA's competitive lead.

TSMC Q3'24 Results (Oct-17) – see related report

According to TSMC, the demand for AI is "real" and "will continue for many years" based on its partnership with chip suppliers, hyperscalers, and other AI innovators. We still see TSMC capex rising YoY throughout CY24-26E, with CoWoS capacity ests still intact at 40k/month exiting 2024 and 80k exiting 2025 (supply visibility for NVDA). Continued N2 node investment at TSMC (Apple silicon, AMD CPU) is also a positive for NVDA.

ASML Q3'24 Results (Oct-16) – see ASML report

ASML's CY25 outlook cut suggests an increasing divergence of demand in AI-related (compute, networking, HBM) and non-AI related (PC, smartphone, auto/industrial) semis. Overall, we see continued strong growth in leading-edge (AI) investments, with secular growth outlooks for AI-related semis generally unimpacted.

MU IR Meeting (Oct-11) – see MU report

MU (Micron Technology) highlighted the rise of AI and its related data center products (HBM, eSSD), with its HBM3e ramp/visibility/pricing still intact regardless of the entry of a third vendor (Samsung). AI is dramatically increasing the memory demand curve, and MU continues to improve its market position in data centers. MU expressed confidence in reaching 20-25% HBM share in CY25E ($13-15bn/qtr. exiting NovQ'25), and their DC SSD business is now 40%+ of NAND sales versus just ~20% for industry bits.

AVGO Mgmt Meeting (Oct-10) – see AVGO report

The meeting focused on AVGO's (Broadcom's) growing AI opportunity, with a longer-term TAM of $100-$125bn, focused largely on growing internal workloads. Demand for AVGO's networking is growing rapidly, as the size of LLMs is driving ever increasing AI cluster sizes (100K accelerator or XPU cluster going to 1mn over time) – also a tailwind for NVDA Networking. Near term (next 12 months) management characterized AI visibility as pretty good, with good support/adequate supply from the Asia supply chain.

AMD Advancing AI Event (Oct-10) – see AMD report

Importantly, performance of AMD's (Advanced Micro Devices) new MI325X generally remains a full year behind NVDA's latest Blackwell (details on pg. 9), with no n-t catalyst to change the dynamic. However, AMD raised its AI accelerator TAM to $500bn by CY28 from $400bn by CY27 prior. While we expect NVDA to maintain 75-80% leadership share, we highlight that a bull-case scenario for 10% AI share for AMD remains possible, given continued hardware (MI350 35x inference, 7x training gen-over-gen vs. Blackwell 30x inference, 4x training), software stack (ROCm), and networking (DPU) improvements.

Optical Expert Meeting (Oct-7)

We hosted Dr. Vlad Kozlov, CEO and Chief Analyst at LightCounting to discuss the latest on the optical/AI industry. Key takeaways: (1) NVDA transceivers make up >50% of AI clusters today given their fast time to market (fully functional in NVDA GPU systems), but expect non-NVDA offerings to take over by CY25-26 (mostly 800G Ethernet modules); (2) average optical transceiver count in an NVDA system is 2.5 per GPU today, but could rise to 10 transceivers per GPU as the size of the cluster increases (more layers of switches required); (3) optical transceiver count for a TPU-based system is fixed at 1.5 per TPU, regardless of the TPU version; (4) there is a lot of scope for differentiation between transceivers from each vendor (InnoLight, Coherent, etc.); (5) Retimers/DSPs to remain mainstream at 1.6T (200G/lane) speed, though by CY27/28 we could start to see the first major (5-10%) deployment of LPOs/CPOs; (6) NVDA DSPs likely targeted at high performance systems with high power consumption, still a few years away; and (7) Google is pioneering in optical circuit switches (OCSes) that could potentially replace some Ethernet switches at the spine level (leaf still Ethernet) as the size of cluster increases.

Increased supply visibility

CoWoS

CoWoS supply capacity has been one of the gating factors of NVDA Data Center accelerator growth, and we now see TSMC CoWoS capacity outlook of 40k/month exiting CY24 and 80k-100k exiting CY25, up from 37.5k/55k for CY24/25 just six months ago. We estimate NVDA will maintain 50-60% of the allocation (AVGO TPU ~20%, AMD ~10%, AWS <10%, others rest), or enough to manufacture ~2mn Blackwells (~$35K ASP) or ~4mn Hoppers (~$22-23K ASP) per quarter exiting CY25.

Exhibit 1: TSMC CoWoS Capacity (k) and NVDA allocation
We see CoWoS capacity of 80-100k/month, or ~240k/qtr, exiting CQ4'25. NVDA at 50-60% allocation could have 130k/qtr capacity
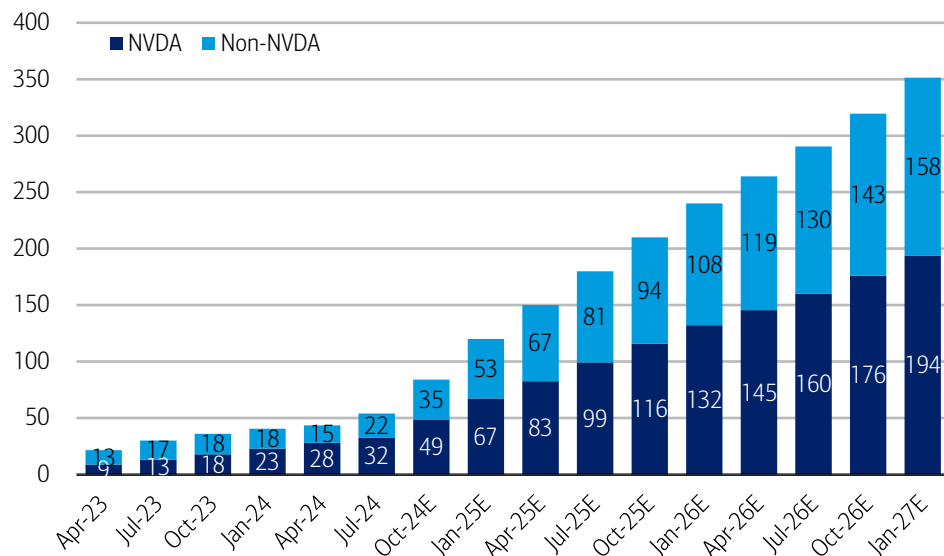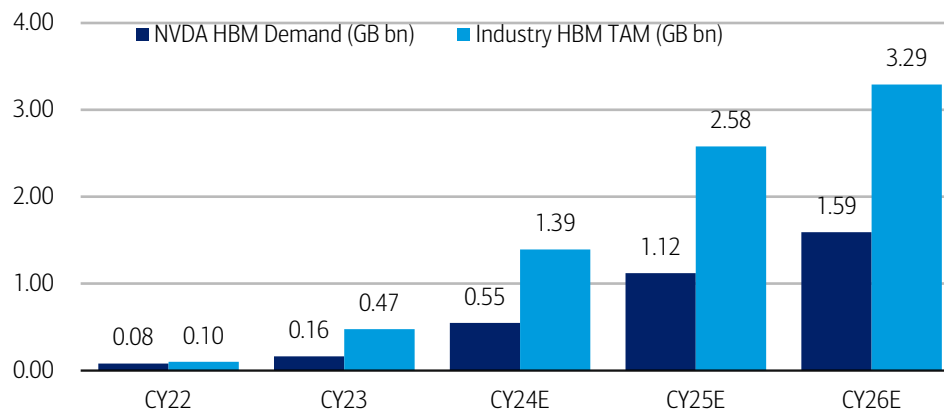

Source: BofA Global Research estimates

HBM

HBM supply outlook visibility has also improved, with our latest forecast now pointing to $27bn/$29bn TAM for CY25/26E vs. $22bn/$24bn in Sept. In bit terms, we now expect industry capacity of 2.58bn/3.29bn GB in CY25/26E, which would be more than sufficient for our NVDA demand expectation of 1.12bn/1.59bn GB.

Exhibit 2: NVDA HBM Demand vs. Industry HBM Capacity (TAM)
We expect more than HBM capacity to satisfy NVDA demand for the next three years

Source: BofA Global Research estimates

Generational Opp'ty – $400bn+ AI TAM

Driven by our increased NVDA Data Center Compute outlook, we now see the AI accelerator market growing to $280bn by CY27E (and over time toward $400bn+) from just ~$45bn in CY23. AI models (demand) continue to evolve, with the cadence of new LLM model launches now increased to 3-5 times/yr per developer (OpenAI, Google, Meta, etc.), and each new major generation requiring 10-20x compute requirement to train.

Separately, AMD expects $500bn TAM by CY28E and Cerebras sees $450bn by CY27E.

Exhibit 3: AI Accelerator TAM ($bn)
We see TAM to reach $280bn by CY27E and NVDA to maintain 75%+ share over time

AI Accelerator Market Share	CY22	CY23	CY24E	CY25E	CY26E	CY27E
Nvidia ($bn)	$11.47	$38.80	$95.26	$151.57	$186.49	$211.07
YoY		238%	146%	59%	23%	13%
Implied Share	82%	87%	81%	77%	76%	75%
AMD (Consensus) ($bn)	$0.12	$0.51	$5.12	$9.69	$12.77	$19.36
YoY		307%	912%	89%	32%	52%
Implied Share	1%	1%	4%	5%	5%	7%
Broadcom ($bn)	$2.34	$4.10	$9.08	$12.21	$14.17	$16.30
YoY		75%	122%	34%	16%	15%
Implied Share	17%	9%	8%	6%	6%	6%
Marvell ($bn)	$0.00	$0.04	$0.60	$1.35	$1.85	$2.21
YoY			1400%	125%	37%	20%
Implied Share	0%	0%	1%	1%	1%	1%
Others ($bn)	$0.05	$1.41	$6.99	$21.05	$30.50	$31.07
YoY		2571%	396%	201%	45%	2%
Implied Share	0%	3%	6%	11%	12%	11%
Total Market ($bn)	$13.98	$44.85	$117.05	$195.88	$245.78	$280.01
YoY		221%	161%	67%	25%	14%

Source: BofA Global Research estimates, Visible Alpha

BofA GLOBAL RESEARCH

Exhibit 4: AI Accelerator TAM Analysis
We see TAM to reach $360bn+ by CY30E, $400bn+ over time

Accelerator TAM Analysis	CY20	CY21	CY22	CY23	CY24E	CY25E	CY26E	CY27E	CY28E	CY29E	CY30E
NVDA Data Center ($mn)	$6,696	$10,613	$15,005	$47,525	$110,739	$176,162	$216,756	$248,315	$271,283	$295,380	$320,570
NVDA Networking ($mn)	$1,631	$2,820	$3,538	$8,727	$15,482	$24,595	$30,263	$37,247	$40,692	$44,307	$48,085
NVDA Compute ($mn)	**$5,065**	**$7,793**	**$11,467**	**$38,798**	**$95,257**	**$151,567**	**$186,493**	**$211,067**	**$230,590**	**$251,073**	**$272,484**
Assumed NVDA Revenue Share	85%	85%	82%	87%	81%	77%	76%	75%	75%	75%	75%
Global Accelerator TAM ($mn)	**$5,959**	**$9,168**	**$13,985**	**$44,854**	**$117,054**	**$195,877**	**$245,778**	**$280,010**	**$307,337**	**$334,637**	**$363,174**
YoY	70%	54%	53%	221%	161%	67%	25%	14%	10%	9%	9%
Accelerated Server Calculation											
NVDA Data Center GPU Units (k, Mercury/BofA)	1,543	2,473	2,595	2,586	4,977	6,190	7,066	8,160	9,097	10,107	11,192
GPU ASP ($)	$3,283	$3,152	$4,419	$15,004	$19,140	$24,485	$26,394	$25,867	$25,349	$24,842	$24,345
GPU Per AI Server	4.0	4.0	3.9	2.4	3.4	4.1	4.5	4.7	5.0	5.2	5.5
GPU Content/AI Server ($)	$13,131	$12,607	$17,357	$36,594	$65,022	$101,388	$117,728	$121,840	$125,741	$129,437	$132,934
NVDA AI Servers (k)	386	618	661	1,060	1,465	1,495	1,584	1,732	1,834	1,940	2,050
Assumed NVDA Server Unit Share	70%	70%	68%	58%	53%	43%	40%	40%	40%	40%	40%
Total Accelerated Servers (k)	**551**	**883**	**966**	**1,828**	**2,764**	**3,517**	**3,960**	**4,331**	**4,585**	**4,849**	**5,124**
Global Server Shipments (mn, IDC/BofA)	12.7	13.5	14.9	12.0	13.0	14.2	15.5	16.7	17.2	17.7	18.1
Accelerated Server (%)	**4.4%**	**6.5%**	**6.5%**	**15.3%**	**21.3%**	**24.8%**	**25.5%**	**26.0%**	**26.6%**	**27.5%**	**28.3%**

Source: BofA Global Research estimates, IDC, Mercury Research

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## AI models continue to grow rapidly

We continue to see the pace of new model development increase. LLMs in particular are being developed for both larger size and better reasoning capabilities, which both require greater training intensity. We highlight the recently launched OpenAI o1 model (code-named Strawberry) designed for improved reasoning. The o1 is not a successor to GPT-4o but rather a complement, with the successor GPT-5 (larger size, 10-20x training cost over GPT-4) still coming likely late this year. While the cost to train the o1 has not

been published, the cost to use it has increased 3x to $15 per 1mn input tokens vs. just $5 for GPT-4o. Per OpenAI, the o1 required a new specifically tailored training dataset to train.

Exhibit 5: Timeline and Number of Parameters of Major LLM AI Models
OpenAI's GPT-4 was trained on 1.76tn parameters
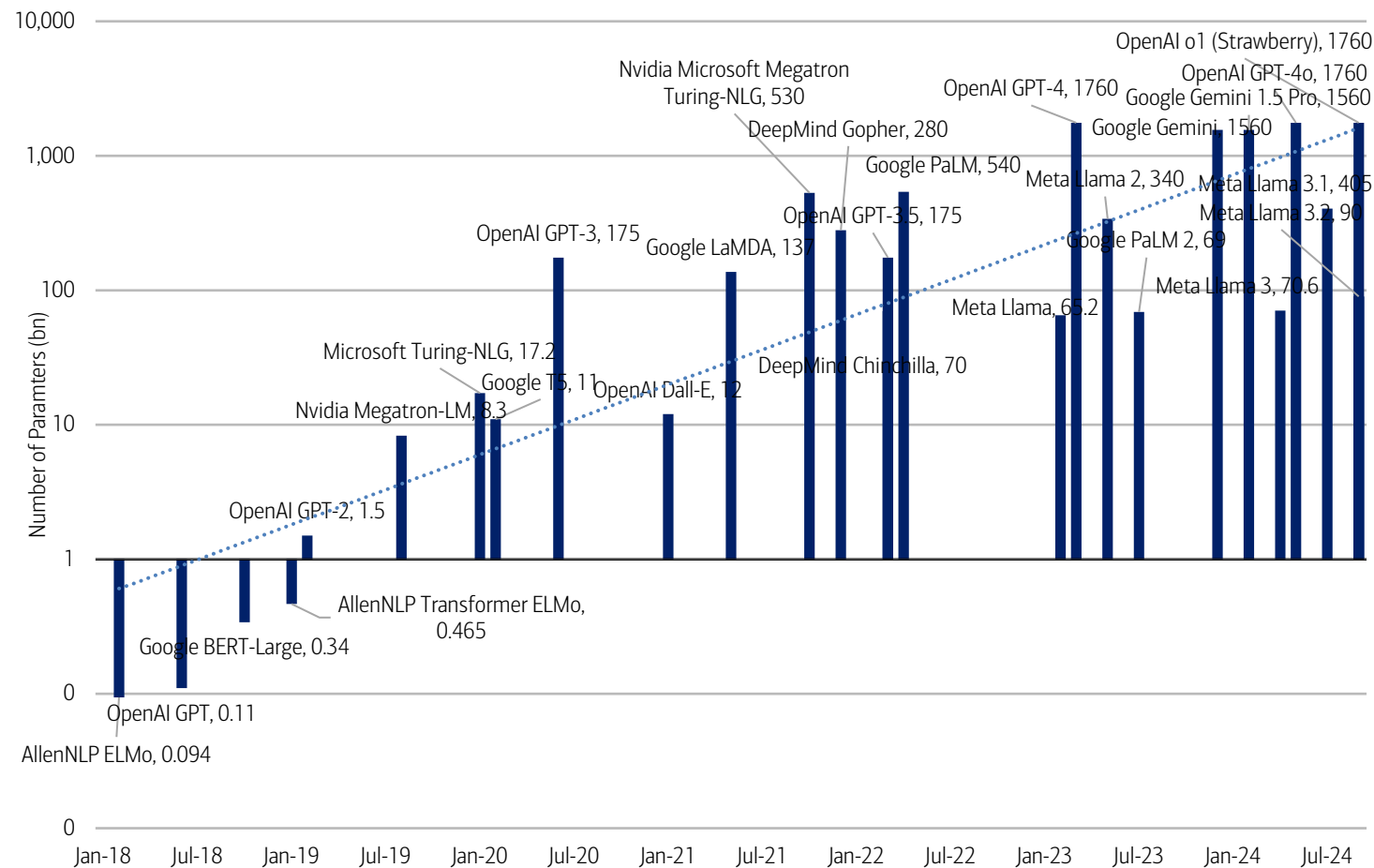
Source: BofA Global Research estimates

Cloud/Carrier Capex Overview

Exhibit 6:Summary of Cloud Capex Outlook
Consensus aggregate projections now suggest capex across major cloud vendors can grow +14% YoY in CY25E

CapEx ($mn)	C1Q24	C2Q24	C3Q24E	C4Q24E	C1Q25E	C2Q25E	C3Q25E	C4Q25E	2020	2021	2022	2023	2024E	2025E	2026E
Total US	**45,963**	**55,650**	**58,296**	**62,110**	**60,703**	**65,168**	**63,662**	**66,464**	**96,964**	**130,654**	**157,932**	**154,383**	**222,019**	**255,997**	**271,698**
Google	12,012	13,186	12,701	12,870	13,175	13,849	13,792	14,229	22,281	24,640	31,485	32,251	50,769	55,046	57,755
Microsoft	10,952	13,873	14,488	14,418	14,515	15,209	15,256	15,610	17,592	23,216	24,768	35,202	53,731	60,589	66,892
Amazon	14,925	17,620	17,749	18,839	17,648	19,515	19,432	20,114	40,141	61,053	63,645	52,729	69,133	76,709	82,288
Meta	6,400	8,173	11,054	12,465	11,303	11,772	11,968	12,880	15,115	18,627	31,356	27,266	38,092	47,922	49,142
Oracle	1,674	2,798	2,303	3,518	4,062	4,823	3,214	3,630	1,835	3,118	6,678	6,935	10,293	15,730	15,621
Total China	**3,880**	**3,314**	**3,821**	**3,793**	**3,203**	**3,650**	**3,823**	**3,990**	**11,237**	**12,918**	**9,410**	**7,910**	**14,808**	**14,665**	**15,663**
Alibaba	1,571	1,703	2,028	1,470	1,403	2,119	2,076	1,627	5,575	6,030	5,490	3,006	6,771	7,225	7,748
Tencent	2,022	1,229	1,423	1,881	1,551	1,175	1,333	1,840	4,912	5,196	2,703	3,344	6,556	5,899	6,342
Baidu	287	381	370	443	249	355	415	523	750	1,693	1,217	1,561	1,480	1,541	1,573
Total	**49,843**	**58,964**	**62,116**	**65,903**	**63,907**	**68,818**	**67,484**	**70,454**	**108,201**	**143,572**	**167,342**	**162,293**	**236,827**	**270,662**	**287,361**

YoY %

	C1Q24	C2Q24	C3Q24E	C4Q24E	C1Q25E	C2Q25E	C3Q25E	C4Q25E	2020	2021	2022	2023	2024E	2025E	2026E
Total US	**25.7%**	**57.1%**	**52.2%**	**40.9%**	**32.1%**	**17.1%**	**9.2%**	**7.0%**	**35.0%**	**34.7%**	**20.9%**	**(2.2%)**	**43.8%**	**15.3%**	**6.1%**
Google	91.0%	91.4%	57.7%	16.8%	9.7%	5.0%	8.6%	10.6%	(5.4%)	10.6%	27.8%	2.4%	57.4%	8.4%	4.9%
Microsoft	65.8%	55.1%	46.1%	48.1%	32.5%	9.6%	5.3%	8.3%	29.9%	32.0%	6.7%	42.1%	52.6%	12.8%	10.4%
Amazon	5.1%	53.8%	42.2%	29.1%	18.2%	10.8%	9.5%	6.8%	138.1%	52.1%	4.2%	(17.2%)	31.1%	11.0%	7.3%
Meta	(6.5%)	31.5%	68.9%	62.6%	76.6%	44.0%	8.3%	3.3%	0.1%	23.2%	68.3%	(13.0%)	39.7%	25.8%	2.5%
Oracle	(36.3%)	46.3%	75.3%	225.8%	142.7%	72.4%	39.6%	3.2%	(33.8%)	69.9%	114.2%	3.8%	48.4%	52.8%	(0.7%)
Total China	**224.3%**	**89.8%**	**78.1%**	**34.4%**	**(17.5%)**	**10.1%**	**0.1%**	**5.2%**	**28.6%**	**15.0%**	**(27.2%)**	**(15.9%)**	**87.2%**	**(1.0%)**	**6.8%**
Alibaba	329.4%	105.7%	259.4%	17.8%	(10.7%)	24.4%	2.4%	10.7%	23.1%	8.2%	(9.0%)	(45.3%)	125.3%	6.7%	7.2%
Tencent	214.9%	125.6%	29.7%	77.5%	(23.3%)	(4.4%)	(6.4%)	(2.2%)	50.2%	5.8%	(48.0%)	23.7%	96.1%	(10.0%)	7.5%
Baidu	52.2%	2.2%	(23.6%)	(14.2%)	(13.2%)	(6.8%)	12.1%	18.1%	(20.0%)	125.5%	(28.1%)	28.3%	(5.2%)	4.1%	2.0%
Total	**32.0%**	**58.7%**	**53.6%**	**40.5%**	**28.2%**	**16.7%**	**8.6%**	**6.9%**	**34.3%**	**32.7%**	**16.6%**	**(3.0%)**	**45.9%**	**14.3%**	**6.2%**

Cap. intensity (%)

	C1Q24	C2Q24	C3Q24E	C4Q24E	C1Q25E	C2Q25E	C3Q25E	C4Q25E	2020	2021	2022	2023	2024E	2025E	2026E
Total US	**13.7%**	**15.9%**	**16.7%**	**15.6%**	**16.6%**	**17.0%**	**16.1%**	**14.8%**	**11.4%**	**12.2%**	**13.6%**	**11.9%**	**15.5%**	**16.1%**	**15.5%**
Google	14.9%	15.6%	17.3%	15.8%	16.5%	16.4%	15.8%	14.7%	12.2%	9.6%	11.1%	10.5%	15.9%	15.8%	16.1%
Microsoft	17.7%	21.4%	22.5%	20.6%	20.7%	20.6%	20.8%	19.8%	11.5%	12.6%	12.1%	15.5%	20.6%	20.5%	19.8%
Amazon	10.4%	11.9%	11.3%	10.1%	11.1%	11.9%	11.2%	9.8%	10.4%	13.0%	12.4%	9.2%	10.9%	10.9%	10.6%
Meta	17.6%	20.9%	27.5%	27.1%	27.2%	26.4%	26.0%	24.4%	17.6%	15.8%	26.9%	20.2%	23.5%	25.9%	23.5%
Oracle	12.6%	19.6%	17.3%	24.9%	27.6%	30.0%	21.4%	22.8%	4.7%	7.5%	14.5%	13.4%	18.7%	25.5%	22.4%
Total China	**6.8%**	**5.5%**	**6.1%**	**5.5%**	**5.0%**	**5.4%**	**5.6%**	**5.4%**	**6.3%**	**5.8%**	**4.2%**	**3.4%**	**5.9%**	**5.3%**	**5.3%**
Alibaba	5.1%	5.1%	6.0%	3.7%	4.1%	5.7%	5.7%	3.8%	5.9%	5.0%	4.4%	2.3%	4.9%	4.8%	4.8%
Tencent	9.1%	5.5%	6.0%	7.8%	6.2%	4.6%	4.9%	7.0%	7.2%	6.2%	3.3%	3.9%	7.1%	5.7%	5.8%
Baidu	6.5%	8.1%	7.6%	8.7%	5.3%	6.9%	7.8%	9.8%	4.8%	9.3%	6.9%	8.2%	7.8%	7.5%	7.2%
Total	**12.7%**	**14.3%**	**15.1%**	**14.1%**	**14.9%**	**15.3%**	**14.5%**	**13.4%**	**10.6%**	**11.1%**	**12.1%**	**10.6%**	**14.1%**	**14.5%**	**14.0%**

Source: BofA Global Research estimates, Bloomberg

Exhibit 7: Summary of US Carrier Capex
US carrier capex intensity increased to 16.8% at the height of 5G investment cycle

US Carrier	C1Q24	C2Q24	C3Q24E	C4Q24E	C1Q25E	C2Q25E	C3Q25E	C4Q25E	2020	2021	2022	2023	2024E	2025E	2026E
CapEx ($mn)	**10,761**	**10,095**	**11,284**	**12,313**	**11,214**	**11,091**	**11,248**	**11,638**	**44,901**	**52,190**	**56,683**	**46,421**	**44,453**	**45,191**	**46,254**
Verizon	4,376	3,695	4,343	4,742	4,253	4,257	4,327	4,535	18,192	20,286	23,087	18,767	17,156	17,372	17,668
AT&T	3,758	4,360	4,986	5,270	4,403	4,471	4,620	4,806	15,675	19,578	19,626	17,853	18,374	18,301	18,855
T-Mobile	2,627	2,040	1,955	2,301	2,557	2,364	2,301	2,297	11,034	12,326	13,970	9,801	8,923	9,519	9,731
Cap. intensity (%)	**13.0%**	**12.3%**	**13.4%**	**13.8%**	**13.3%**	**13.1%**	**13.1%**	**12.8%**	**12.2%**	**14.7%**	**16.8%**	**13.9%**	**13.2%**	**13.1%**	**13.2%**
Verizon	13.3%	11.3%	13.0%	13.4%	12.7%	12.7%	12.7%	12.6%	14.2%	15.2%	16.9%	14.0%	12.7%	12.7%	12.7%
AT&T	12.5%	14.6%	16.4%	16.3%	14.4%	14.8%	15.0%	14.7%	9.1%	13.8%	16.3%	14.6%	15.0%	14.7%	15.1%
T-Mobile	13.4%	10.3%	9.8%	10.8%	12.4%	11.5%	11.1%	10.4%	16.1%	15.4%	17.6%	12.5%	11.1%	11.3%	11.1%

Source: BofA Global Research estimates, Bloomberg

Key NVDA Roadmaps vs. Competition

NVDA will ramp its flagship Blackwell platform beginning CQ4'24 and throughout CY25. AMD's latest MI325X comes with 256GB HBM3E and 6.0TB/s bandwidth, 1.8x and 1.3x greater than the H200. However, training perf still seems 1 year behind Blackwell (on par with H200) while inferencing is only slightly better continued ROCm optimization.

Exhibit 8: Key Accelerator Roadmaps

AMD will ramp MI300 throughout CY25, while NVDA will ramp Blackwell during the same time frame

BofA Securities		1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26	4Q26	1Q27	2Q27	3Q27	4Q27
Server Accel.	AMD (MI)	CDNA 2 "MI200/250" (T-6nm)			CDNA 3 + Zen 4 "MI300" (T-5nm / T-6nm)				CDNA 3 + Zen 4 "MI325" (T-5nm / T-6nm)				CDNA 4 + Zen 5 "MI350" (T-3nm)				CDNA Next + Zen 6 "MI400" (T-2nm)			
	NVDA (GPU)	"Hopper" "H100" (T-4nm)				"H200" (T-4nm)			"Blackwell" "B100/B200" (T-4nm)				"Blackwell Ultra" (T-4nm)				"Rubin" "R100/R200" (T-3nm)			"Rubin Ultra" (T-3nm)	
	NVDA (CPU+GPU)				"Grace Hopper" "GH200" (T-4nm / T-4nm)				"Grace Blackwell" "GB200" (T-4nm)				"Grace Blackwell Ultra" (T-4nm)				"Vera Rubin" "VR200" (T-2nm / T-2nm)			
	INTC (GPU)	"Ponte Vecchio" (T-5nm / T-7nm / I-7)										"Falcon Shores" (Advanced Node)					"Falcon Shores 2" (Advanced Node)			
	INTC (ASIC)	"Gaudi (T-16nm)	"Gaudi 2" (T-7nm)					"Gaudi 3" (T-5nm)													

Source: BofA Global Research estimates, company data

Exhibit 9: AMD vs. NVDA Accelerator Key Specs

AMD packs in more HBM capacity than NVDA counterparts, but training/inference performance generally remains a full year behind due to software/systems difference

Vendor	AMD	AMD	AMD	AMD	NVDA	NVDA	NVDA	NVDA	NVDA	NVDA
Product	MI300	MI325	MI350	MI400	H100	H200	B100/B200	Blackwell Ultra	Rubin	Rubin Ultra
Architecture	CDNA 3	CDNA 3	CDNA 4	CDNA Next	Hopper	Hopper	Blackwell	Blackwell Ultra	Rubin	Rubin Ultra
Expected launch date	4Q23	4Q24	4Q25	4Q26	3Q22	1Q24	4Q24	3Q25	3Q26	3Q27
Process node	5nm/6nm	5nm/6nm	3nm	2nm?	4nm	4nm	4nm	4nm	3nm	3nm
Memory	HBM3	HBM3e	HBM3e	HBM4	HBM3	HBM3e	HBM3e 8-high	HBM3e 12-high	HBM4	HBM4
	192GB	256GB	288GB		80GB	141GB	192GB	288GB		1.5x Rubin
Scale up	Infinity Fabric	Infinity Fabric	UALink?	UALink?	NVLink 4.0	NVLink 4.0	NVLink 5.0	NVLink 5.0	NVLink 6.0	NVLink 6.0
Scale out	Ethernet	Ethernet	Ultra Ethernet	Ultra Ethernet	Ethernet InfiniBand	Ethernet InfiniBand	Spectrum-X Quantum-X800	Spectrum Ultra X800 Quantum-X800	Spectrum-X1600 Quantum-X1600	Spectrum-X1600 Quantum-X1600
CPU (if paired)	Zen 4	Zen 4	Zen 5	Zen 6	Grace	Grace	Grace	Grace	Vera	Vera

Source: BofA Global Research estimates, company data

Broadening Enterprise Adoption of AI

The role of software and the Nvidia AI ecosystem
We highlight NVDA's significant leadership in AI ecosystem, spanning across CUDA, DGX Cloud AI supercomputing platform, Nvidia AI Workbench, Nvidia AI Enterprise Software, Nvidia AI Foundry, and importantly Nvidia Inference Microservice – or NIM.

NIM – the AI inference accelerator for enterprises
We expect NIM, a simple and standardized set of microservices that vastly accelerates AI inference deployment, to gain continued increased traction over time given the rising significance of AI deployment for enterprises/sovereigns. We particularly believe recurring software services could open the next leg of growth for NVDA, while strengthening its direct relationship with enterprise users.

While tough to measure the exact impact of NIM to NVDA's financials given its early stage today, deployment of NIMs in production requires an NVIDIA AI Enterprise license, which starts at $4,500/GPU/yr or $1/GPU/hr in the cloud.

Nvidia AI Foundry – next step to enterprise AI deployment
Late last year, Nvidia also launched Nvidia AI Foundry – a comprehensive genAI model service and the next step for deploying AI for enterprises. It is an end-to-end platform that enables enterprises/sovereigns to build custom genAI "supermodels". Essentially, customers can create custom models for their domain-specific use cases, which can be trained with proprietary data and/or synthetic data created by LLMs. Importantly, AI Foundry now supports the largest open source LLMs of today, including the recently launched **Meta Llama 3.1** with 405bn parameters, as well as Nvidia's in-house Nemotron-4 at 340bn parameters. Accenture was announced as the first customer of AI Foundry to build custom Llama 3.1 models. Once customers develop their own "supermodel", they can utilize Nvidia's NIM inference microservice to run them in production and deploy in real world.

Accenture
In July, Accenture announced the launch of Accenture AI Refinery, built on the NVDA AI Foundry platform, enabling clients to build custom LLM models utilizing the Llama 3.1 open models. Accenture's goal is to provide generative AI service that fits and reflects each customer's unique business need. With NVDA's AI Foundry partnership, Accenture already saw ~$3bn in genAI-related bookings last fiscal year and also launched "Accenture NVIDIA Business Group" to support companies in creating AI agents using the full NVDA stack (AI Foundry, AI Enterprise, Omniverse). In particular, the business group is supported by 30k+ Nvidia-trained AI professionals, enabling a rapid buildout of AI ecosystem, accelerating genAI momentum for Accenture clients, and helping them scale these systems.

ServiceNow
ServiceNow has collaborated with NVDA since May 2023 and earlier this year announced platform access to NIM inference microservices. The collaboration has enabled the development of telco-specific and enterprise-grade genAI solutions for customers, enabling faster, scalable, and cost-effective LLM development as well as deployment.

Microsoft
Microsoft has entered into a multi-year partnership with Nvidia to bring confidential computing to GPU-powered workloads on Azure. The collaboration has enabled this by launching the industry's first confidential VMs (virtual machines) with NVIDIA H100 GPUs. While confidential computing has been available on Azure VMs for some time, this is the first time a similar capability has been brought to GPU-powered VMs.

This is an important milestone for the cloud industry whose more data-sensitive customers in healthcare, finance, government, etc. industries can now run small- to medium-sized models on confidential computing in public cloud.

Cloud/AI and the use of nuclear power

In September, Microsoft signed a 20-year power purchase agreement with Constellation, a nuclear energy provider. This deal paved way for the restart of small a module nuclear reactor (SMR) Three Mile Island Unit 1 (shut down in 2019 due to lack of profitability) and the launch of the Crane Clean Energy Center. This deal will restore 835 megawatts (MWs) of carbon-free energy to the grid with the plant expected to be ready for service by 2028 and licensed to operate through 2054. This deal is the third this year in which data center operators are looking into nuclear to fulfill their demand for large and reliable sources of electricity supply. AWS signed a contract for 960 MWs of capacity from Talen Energy's Susquehanna nuclear power plant in PA for $650mn in March. Google said on Oct. 14 that they would buy power from multiple SMRs in a deal with Kairos. The first SMR is expected to be brought online in 2030, followed by additional deployments through 2035 for a total of 500 MW of power. In addition, Oklo, chaired by OpenAI founder Sam Altman, has built a fast fission reactor with the intent to sell to the US Air Force and data centers by 2027.

A race for power has commenced with the power grid unable to bring the high volume of new, power-intensive projects online. Nuclear power is becoming increasingly attractive to data center owners with deep pockets due to consistent high electricity output (no day/night cycles) and relatively low operating costs. With the exponentially increasing power demands of frontier data centers, nuclear power plants can provide sufficient electricity while also aligning with many company's emission goals. However, there remains a great deal of uncertainty about the future demand for electricity, with the AWS/Talen partnership gradually increasing capacity over multiple years instead of taking on the full contracted 960 MW immediately. With nuclear power only in reach of major data center operators due to high ramping costs, early stages will prove to be crucial. How hyperscalers navigate ongoing reliability and cost concerns will also be crucial for the l-t success of nuclear-fueled data centers.

Model Changes

Exhibit 10: NVDA Estimate Changes
We raise FY26/27E EPS by +14.7%/+20.1%

	Sales ($mn)			EPS (Non GAAP, ex. options)		
	Old	NEW	delta	Old	NEW	delta
Apr-24	$26,044	$26,044	$0	$0.61	$0.61	$0.00
Jul-24	$30,040	$30,040	$0	$0.68	$0.68	$0.00
Oct-24E	$32,516	$32,870	$354	$0.73	$0.74	$0.01
Jan-25E	$35,296	$37,264	$1,968	$0.78	$0.83	$0.05
FY25E	**$123,896**	**$126,217**	**$2,322**	**$2.81**	**$2.87**	**$0.06**
YoY%	103.4%	107.2%	1.9%	116.6%	121.2%	2.1%
Apr-25E	$37,634	$41,256	$3,622	$0.84	$0.93	$0.09
Jul-25E	$41,334	$45,860	$4,526	$0.93	$1.04	$0.11
Oct-25E	$43,883	$50,873	$6,990	$1.00	$1.18	$0.17
Jan-26E	$48,493	$56,441	$7,947	$1.13	$1.33	$0.20
FY26E	**$171,344**	**$194,431**	**$23,086**	**$3.90**	**$4.47**	**$0.57**
YoY%	38.3%	54.0%	13.5%	38.9%	55.9%	14.7%
Apr-26E	$49,288	$57,790	$8,502	$1.15	$1.36	$0.22
Jul-26E	$49,374	$58,271	$8,896	$1.15	$1.38	$0.23
Oct-26E	$49,323	$59,011	$9,688	$1.16	$1.41	$0.25
Jan-27E	$53,080	$62,805	$9,726	$1.27	$1.52	$0.25
FY27E	**$201,065**	**$237,877**	**$36,812**	**$4.72**	**$5.67**	**$0.95**
YoY%	17.3%	22.3%	18.3%	21.1%	26.9%	20.1%

Source: BofA Global Research estimates

NVDA Valuation/FCF vs. "Magnificent-7"

NVDA is the only mega cap tech stock currently trading below 1x PEG, well below the "Mag-7" average of 1.9x excluding NVDA (1.8x if includes AVGO), given its strong growth outlook.

Separately, we see NVDA FCF margins of 45-50% range in CY24/25E, nearly double the average of Mag-7 at 23-25%. In $ terms, NVDA could take in $200bn+ of FCF over the next two years, rivaling that of AAPL at (~$220bn).

Exhibit 11: NVDA Valuation vs. Mag 7 Average
NVDA is the only mega cap trading below 1x PEG given its strong growth outlook

Ticker	Mkt. Cap	PE		PEG	Sales YoY		EPS YoY		FCF Margins	
		CY24E	CY25E	CY25E	CY24E	CY25E	CY24E	CY25E	CY24E	CY25E
AAPL	$3,535	33.6x	30.1x	2.6x	3.5%	7.3%	7.8%	11.5%	28.5%	29.2%
MSFT	$3,109	34.1x	29.7x	2.0x	14.7%	13.5%	10.8%	14.7%	28.6%	28.0%
GOOG	$2,039	20.8x	18.4x	1.4x	14.1%	15.8%	31.8%	13.4%	25.5%	27.1%
AMZN	$1,981	32.7x	27.9x	1.6x	10.6%	10.8%	13.6%	17.1%	8.6%	10.2%
META	$1,471	26.8x	23.5x	1.7x	19.8%	14.1%	45.9%	14.2%	28.7%	26.9%
AVGO	$864	36.4x	28.8x	1.1x	41.2%	16.4%	19.1%	26.2%	40.1%	49.3%
TSLA	$703	96.9x	71.1x	2.0x	2.7%	16.5%	-27.3%	36.4%	1.6%	4.7%
Average		*40.2x*	*32.8x*	*1.8x*	*15.2%*	*13.5%*	*14.5%*	*19.1%*	*23.1%*	*25.0%*
NVDA (BofAe)	**$3,435**	**42.3x**	**33.3x**	**0.6x**	**107.2%**	**54.0%**	**121.2%**	**55.9%**	**48.8%**	**47.9%**
NVDA	**$3,435**	**51.1x**	**36.0x**	**0.9x**	**117.6%**	**45.0%**	**137.3%**	**41.9%**	**49.9%**	**50.5%**

Source: BofA Global Research estimates, Bloomberg

Exhibit 12: NVDA CY25E FCF Margin vs. AVGO/"Mag-7"
NVDA FCF margin of ~50% is nearly double that of most "Mag-7" stocks, with only AVGO (not a "Mag-7") FCF coming close
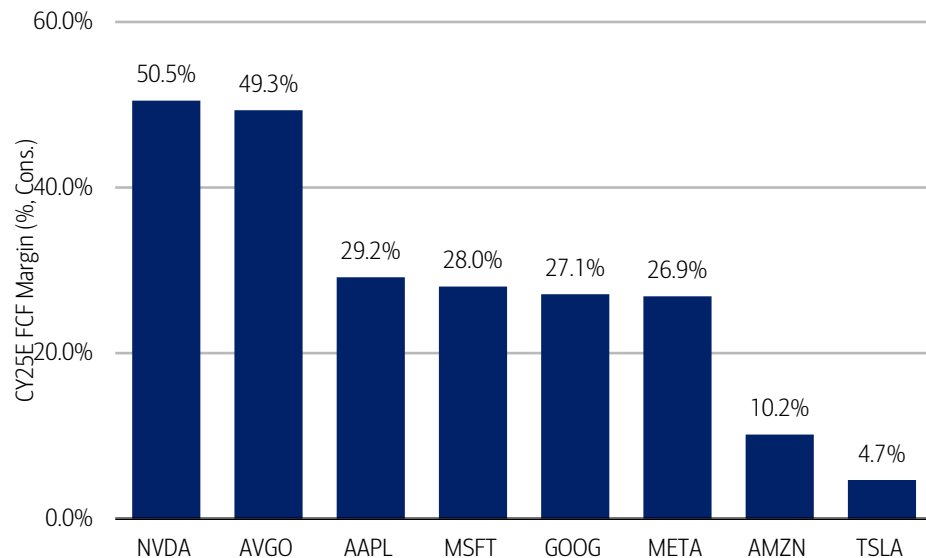
Source: BofA Global Research estimates, Bloomberg

NVDA ownership analysis

Within semis, NVDA was the most-owned stock among active fund managers, with ownership of 70% in Sep '24 (up from 68% in the Jun '24 report), followed by AVGO, AMAT, and AMD (38% - 52% ownership). Qorvo/Skyworks remain the least-owned semi stock with ownership of 4.4% across all active manager funds in the survey.

Exhibit 13: Semiconductors & Semicap equipment - % holdings by active fund managers
NVDA is the most owned amongst semis by active fund managers while SWKS/QRVO are least owned

Ticker	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
NVDA	64.3%	64.8%	64.8%	65.0%	66.3%	66.6%	68.0%	67.8%	68.3%	68.5%	69.2%	69.8%	**70.3%**
AVGO	37.1%	36.7%	36.7%	37.9%	37.9%	40.8%	41.7%	41.6%	44.9%	45.9%	48.1%	50.3%	**52.2%**
AMD	38.6%	36.7%	36.7%	34.1%	34.0%	35.2%	36.1%	37.2%	40.3%	39.4%	39.3%	39.6%	**38.5%**
QCOM	28.7%	27.9%	27.9%	27.1%	26.3%	25.1%	25.4%	26.0%	26.9%	27.3%	30.8%	32.1%	**33.5%**
TXN	28.9%	28.4%	28.4%	27.6%	26.6%	28.4%	28.1%	29.2%	28.9%	28.7%	28.8%	30.2%	**30.2%**
AMAT	32.7%	33.1%	33.1%	33.5%	34.3%	35.2%	36.1%	38.1%	38.9%	39.7%	39.3%	40.1%	**40.1%**
MU	11.7%	11.1%	11.1%	10.6%	11.5%	13.9%	16.9%	17.4%	18.3%	19.2%	19.8%	20.9%	**19.8%**
ADI	25.7%	24.6%	24.6%	24.1%	23.7%	24.6%	24.9%	23.9%	22.9%	22.8%	23.6%	25.5%	**26.1%**
LRCX	31.0%	31.4%	31.4%	31.8%	31.1%	31.4%	31.7%	32.7%	33.7%	33.0%	32.4%	32.4%	**31.6%**
KLAC	21.9%	22.0%	22.0%	21.8%	21.6%	20.7%	21.3%	22.1%	24.0%	22.3%	21.7%	22.3%	**23.6%**
INTC	12.9%	12.9%	12.9%	12.4%	13.3%	14.8%	14.5%	13.9%	14.3%	13.8%	12.6%	11.8%	**11.0%**
SNPS	22.2%	22.9%	22.9%	22.6%	23.1%	22.8%	23.7%	24.5%	24.0%	24.8%	24.7%	25.0%	**25.8%**
CDNS	20.5%	21.1%	21.1%	21.2%	22.2%	22.2%	22.2%	23.0%	24.0%	23.9%	23.6%	23.4%	**22.8%**
NXPI	18.4%	18.5%	18.5%	17.9%	17.2%	16.6%	16.6%	17.1%	16.6%	17.5%	17.3%	17.3%	**17.0%**
MCHP	14.6%	13.5%	13.5%	12.6%	12.4%	11.5%	11.2%	11.5%	11.1%	11.0%	11.5%	11.8%	**11.8%**
ON	12.6%	12.0%	12.0%	11.5%	10.9%	12.1%	12.1%	12.4%	11.1%	9.0%	8.2%	8.5%	**7.7%**
TER	6.7%	6.2%	6.2%	6.2%	5.3%	5.3%	7.1%	6.8%	7.4%	7.3%	8.2%	8.2%	**8.2%**
SWKS	5.3%	4.1%	4.1%	4.1%	4.1%	4.1%	4.4%	5.0%	4.6%	4.2%	4.4%	4.4%	**4.4%**
QRVO	3.2%	3.2%	3.2%	3.2%	3.3%	3.0%	3.0%	2.7%	2.9%	2.8%	3.0%	3.8%	**4.4%**
Median	**22.1%**	**22.4%**	**22.4%**	**22.2%**	**22.6%**	**22.5%**	**22.9%**	**23.5%**	**24.0%**	**23.4%**	**23.6%**	**24.2%**	**23.6%**

Source: BofA US Equity & US Quant Strategy

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However, we note NVDA is generally market-weighted in active portfolios at just ~1x weight against the S&P 500, vs. SNPS 1.84x, KLAC 1.66x, AVGO 1.54x.

Exhibit 14: Semiconductors, Semicap – relative weighting (to index) by active fund managers
SNPS and KLAC are the most overweight semis stocks by active fund managers, while SWKS and QRVO are most underweight

Ticker	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24
NVDA	1.05x	1.03x	1.02x	1.03x	1.02x	1.01x	1.00x	0.98x	1.00x	1.04x	1.04x	1.01x	**0.99x**
AVGO	1.81x	1.81x	1.69x	1.65x	1.69x	1.70x	1.71x	1.70x	1.67x	1.66x	1.49x	1.52x	**1.54x**
AMD	0.86x	0.74x	0.71x	0.68x	0.71x	0.77x	0.76x	0.76x	0.82x	0.80x	0.78x	0.77x	**0.72x**
QCOM	0.71x	0.70x	0.65x	0.63x	0.65x	0.53x	0.52x	0.51x	0.53x	0.52x	0.55x	0.53x	**0.55x**
TXN	1.28x	1.22x	1.19x	1.22x	1.19x	1.22x	1.22x	1.22x	1.26x	1.27x	1.35x	1.35x	**1.35x**
AMAT	1.43x	1.35x	1.35x	1.33x	1.35x	1.25x	1.25x	1.27x	1.25x	1.27x	1.30x	1.32x	**1.29x**
MU	1.46x	1.45x	1.44x	1.45x	1.44x	1.34x	1.38x	1.38x	1.29x	1.34x	1.22x	1.21x	**1.16x**
ADI	1.24x	1.25x	1.15x	1.20x	1.15x	1.17x	1.17x	1.11x	1.14x	1.10x	1.14x	1.17x	**1.20x**
LRCX	1.01x	0.94x	0.93x	0.94x	0.93x	0.90x	0.93x	0.92x	0.94x	0.94x	0.97x	0.96x	**0.92x**
KLAC	1.96x	1.90x	1.87x	1.89x	1.87x	1.81x	1.80x	1.78x	1.77x	1.70x	1.68x	1.67x	**1.66x**
INTC	0.85x	0.82x	0.86x	0.89x	0.86x	0.88x	0.87x	0.86x	0.81x	0.78x	0.63x	0.63x	**0.64x**
SNPS	1.55x	1.53x	1.60x	1.54x	1.60x	1.55x	1.50x	1.48x	1.58x	1.74x	1.79x	1.80x	**1.84x**
CDNS	1.30x	1.30x	1.30x	1.28x	1.30x	1.25x	1.24x	1.26x	1.30x	1.29x	1.28x	1.32x	**1.31x**
NXPI	1.49x	1.44x	1.43x	1.45x	1.43x	1.34x	1.33x	1.36x	1.26x	1.23x	1.25x	1.26x	**1.26x**
MCHP	0.96x	0.83x	0.83x	0.83x	0.83x	0.80x	0.80x	0.80x	0.67x	0.67x	0.73x	0.57x	**0.57x**
ON	0.89x	0.88x	0.90x	1.02x	0.90x	1.11x	0.79x	0.78x	0.71x	0.71x	0.55x	0.55x	**0.56x**
TER	0.46x	0.42x	0.36x	0.39x	0.36x	0.36x	0.38x	0.36x	0.44x	0.45x	0.53x	0.56x	**0.57x**
SWKS	0.09x	0.08x	0.07x	0.08x	0.07x	0.07x	0.07x	0.08x	0.08x	0.07x	0.07x	0.07x	**0.07x**
QRVO	0.08x	0.08x	0.08x	0.08x	0.08x	0.05x	0.05x	0.04x	0.05x	0.04x	0.07x	0.13x	**0.20x**
Median	**1.15x**	**1.13x**	**1.08x**	**1.11x**	**1.08x**	**1.14x**	**1.08x**	**0.98x**	**1.07x**	**1.07x**	**1.09x**	**1.09x**	**0.99x**

Source: BofA US Equity & US Quant Strategy

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Glossary:
AAPL: Apple
AI: Artificial Intelligence
AMD: Advanced Micro Devices
AMZN: Amazon
APU: Accelerated Processing Unit
ASIC: Application-Specific Integrated Circuit
ASP: Average Selling Price
AVGO: Broadcom
AWS: Amazon Web Services
CoWoS: Chip on Wafer on Substrate
CPU: Central Processing Unit
CSP: Cloud Service Provider
DSP: Digital Signal Processor
G: Gigabit
GB: Gigabyte
GPU: Graphics Processing Unit
GPT: Generative Pre-trained Transformer
HBM: High Bandwidth Memory
HPC: High Performance Compute
MRVL: Marvell
MSFT: Microsoft
HPC: High Performance Computing
LLM: Large Language Model
MU: Micron
NIM: Nvidia Inference Microservices
NVDA: Nvidia
MSFT: Microsoft
GOOGL: Google
AMZN: Amazon
ORCL: Oracle
Mag-7: Apple, Microsoft, Google, Amazon, Meta, Broadcom, Tesla
META: Meta Platforms
SNPS: Synopsys
SWKS: Skyworks
T: Terabit
TB: Terabyte
TAM: Total Addressable Market
TSMC: Taiwan Semiconductor Manufacturing Company
TPU: Tensor Processing Unit

Exhibit 15: Stocks mentioned
Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
AMD	AMD US	Advanced Micro	US$ 156.13	C-1-9
AVGO	AVGO US	Broadcom	US$ 176.82	B-1-7
INTC	INTC US	Intel	US$ 22.31	B-3-8
MRVL	MRVL US	Marvell	US$ 81.68	C-1-7
MU	MU US	Micron	US$ 109.24	B-1-7
NVDA	NVDA US	NVIDIA	US$ 137.95	C-1-7

Source: BofA Global Research

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Price objective basis & risk

Advanced Micro Devices, Inc (AMD)
Our $180 PO is based on 38x our 2025E non-GAAP EPS, which is towards the middle of AMD's historical 13x-51x range, justified by AI upside offset by slowdown in cyclical embedded/console markets.

Downside risks: 1) M&A integration risks, 2) Strong competition from larger names, 3) Lumpy nature of consumer and enterprise spending that could create delays in acceptance and success of new products, 4) High reliance on one outsourced manufacturing partner, 5) Maturity of current game console cycle.

Broadcom Inc (AVGO)
Our $215 price objective for Broadcom is based on 33x CY25E P/E, the upper end of its 7x-35x historical range, though justified given double-digit EPS growth and best-in-semis profitability, FCF generation, and returns.

Downside risks to our price objective are: 1) semiconductor cycle risks, including sensitivity to fundamental or sentiment shifts in AI theme, 2) high exposure to Apple and Google with potential design out risks, 3) competitive risks in networking, smartphone, storage, enterprise software markets, including rising NVDA competition in networking, 4) frequent acquirer of assets, which increases financial and integration risks, and 5) large $60bn net-debt.

Intel (INTC)
Our $21 price objective is based on 23x our 2025E pf-EPS ex-stock comp expenses, within historical 11x-28x range and toward the bottom of compute peers (24x-36x), which we view as appropriate given manufacturing uncertainties and risks of new foundry strategy.

Upside risks to our price objective are 1) a stronger than expected PC market from Windows 10 refresh or AI uplift, 2) geopolitical tensions boosting sentiment for domestic manufacturing asset, 3) new products allowing Intel to limit share loss, 4) manufacturing slip up at key foundry competitors.

Downside risks to our price objective are 1) weaker-than-expected trends in a mature PC market, which is largest revenue generator for Intel, 2) delays in process technology and roadmap, 3) accelerated share loss to major competitors, 4) more competition in profitable data center market.

Marvell Technology, Inc. (MRVL)
Our $90 PO is based on a 37x FY26E/CY25E pf-EPS, which is well-supported by the 20%-30%+ longer-term compounded annual EPS growth potential, and within the

normal 1x-2x range for high growth semi peers.

Downside risks: 1) Integration risks in recent deals, 2) Financial risks related to going to net debt from net cash position, and in achieving expected cost synergies in a timely manner, and 3) Cyclical industry risks including potential slowdown in legacy hard disk drive, infrastructure spending, and storage assets, 4) Competitive risks against larger well resourced rivals.

Micron Technology, Inc (MU)

Our $125 PO is based on 2.5x our CY25E P/B, which is within MU's long-term range 0.8x-3.1x as we are potentially in the middle of the memory cycle.

Downside risks: (1) larger than expected memory ASP decline, (2) greater competition from China newcomers, (3) share loss to large competitors, (4) softening of demand across major end markets such as data center, smartphones, or PCs.

NVIDIA Corporation (NVDA)

Our $190 PO is based on 42x CY25E PE ex cash, within NVDA's historical 21x-67x forward year PE range, which we believe is justified given stronger growth opportunities ahead as gaming cycle troughs and data center demand potentially faces strong, long-term demand dynamics.

Downside risks are: 1) weakness in consumer driven gaming market, 2) Competition with major public firms, internal cloud projects and other private companies in AI and accelerated computing markets, 3) Larger than expected impact from restrictions on compute shipments to China, or additional restrictions placed on activity in the region, 4) Lumpy and unpredictable sales in new enterprise, data center, and autos markets, 5) Potential for decelerating capital returns, and 5) Enhanced government scrutiny of NVDA's dominant market position in AI chips.

Analyst Certification

I, Vivek Arya, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

US - Semiconductors and Semiconductor Capital Equipment Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	Advanced Micro Devices, Inc	AMD	AMD US	Vivek Arya
	Analog Devices Inc.	ADI	ADI US	Vivek Arya
	Applied Materials, Inc.	AMAT	AMAT US	Vivek Arya
	Arm Holdings	ARM	ARM US	Vivek Arya
	Broadcom Inc	AVGO	AVGO US	Vivek Arya
	Cadence	CDNS	CDNS US	Vivek Arya
	Camtek	CAMT	CAMT US	Vivek Arya
	Coherent Corp	COHR	COHR US	Vivek Arya
	KLA Corporation	KLAC	KLAC US	Vivek Arya
	Lam Research Corp.	LRCX	LRCX US	Vivek Arya
	M/A-Com	MTSI	MTSI US	Vivek Arya
	Marvell Technology, Inc.	MRVL	MRVL US	Vivek Arya
	Micron Technology, Inc	MU	MU US	Vivek Arya
	MKS Instruments	MKSI	MKSI US	Vivek Arya
	Nova	NVMI	NVMI US	Vivek Arya
	NVIDIA Corporation	NVDA	NVDA US	Vivek Arya
	NXP Semiconductors NV	NXPI	NXPI US	Vivek Arya
	onsemi	ON	ON US	Vivek Arya

US - Semiconductors and Semiconductor Capital Equipment Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
	Synopsys	SNPS	SNPS US	Vivek Arya
NEUTRAL				
	Advanced Energy Industries	AEIS	AEIS US	Duksan Jang
	Axcelis Technologies	ACLS	ACLS US	Duksan Jang
	GlobalFoundries	GFS	GFS US	Vivek Arya
	Microchip	MCHP	MCHP US	Vivek Arya
	Texas Instruments Inc.	TXN	TXN US	Vivek Arya
UNDERPERFORM				
	Ambarella	AMBA	AMBA US	Vivek Arya
	Credo Technology	CRDO	CRDO US	Vivek Arya
	Intel	INTC	INTC US	Vivek Arya
	Lattice Semiconductor	LSCC	LSCC US	Duksan Jang
	Lumentum Holdings	LITE	LITE US	Vivek Arya
	Qorvo Inc.	QRVO	QRVO US	Vivek Arya
	Skyworks Solutions, Inc.	SWKS	SWKS US	Vivek Arya
	Teradyne	TER	TER US	Vivek Arya
	Wolfspeed Inc	WOLF	WOLF US	Vivek Arya

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Business Performance	Numerator	Denominator
Return On Capital Employed	NOPAT = (EBIT + Interest Income) × (1 − Tax Rate) + Goodwill Amortization	Total Assets − Current Liabilities + ST Debt + Accumulated Goodwill Amortization
Return On Equity	Net Income	Shareholders' Equity
Operating Margin	Operating Profit	Sales
Earnings Growth	Expected 5 Year CAGR From Latest Actual	N/A
Free Cash Flow	Cash Flow From Operations − Total Capex	N/A

Quality of Earnings	Numerator	Denominator
Cash Realization Ratio	Cash Flow From Operations	Net Income
Asset Replacement Ratio	Capex	Depreciation
Tax Rate	Tax Charge	Pre-Tax Income
Net Debt-To-Equity Ratio	Net Debt = Total Debt − Cash & Equivalents	Total Equity
Interest Cover	EBIT	Interest Expense

Valuation Toolkit	Numerator	Denominator
Price / Earnings Ratio	Current Share Price	Diluted Earnings Per Share (Basis As Specified)
Price / Book Value	Current Share Price	Shareholders' Equity / Current Basic Shares
Dividend Yield	Annualised Declared Cash Dividend	Current Share Price
Free Cash Flow Yield	Cash Flow From Operations − Total Capex	Market Cap = Current Share Price × Current Basic Shares
Enterprise Value / Sales	EV = Current Share Price × Current Shares + Minority Equity + Net Debt + Other LT Liabilities	Sales
EV / EBITDA	Enterprise Value	Basic EBIT + Depreciation + Amortization

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Disclosures

Important Disclosures

Equity Investment Rating Distribution: Technology Group (as of 30 Sep 2024)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	220	54.73%	Buy	111	50.45%
Hold	94	23.38%	Hold	47	50.00%
Sell	88	21.89%	Sell	27	30.68%

Equity Investment Rating Distribution: Global Group (as of 30 Sep 2024)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	1863	54.91%	Buy	1079	57.92%
Hold	768	22.63%	Hold	447	58.20%
Sell	762	22.46%	Sell	349	45.80%

[R1] Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[R2]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R2]Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

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