US Semiconductors

State of the Union: Extended, Not Expensive, AI has staying power

Industry Overview

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Equity
United States
Semiconductors

Vivek Arya
Research Analyst
BofAS
vivek.arya@bofa.com

Duksan Jang
Research Analyst
BofAS
duksan.jang@bofa.com

Michael Mani
Research Analyst
BofAS
michael.mani@bofa.com

Liam Phharr
Research Analyst
BofAS
liam.pharr@bofa.com

SOX rally = earnings-led, not PE multiple-driven

Semis are up ~72% YTD with heavy index weight (~18% of S&P 500), raising macro sensitivity. Crucially, the move is earnings-led: forward P/E at ~25.6x is broadly unchanged YTD and still below prior ~30x peaks. We see limited evidence of speculative multiple inflation, supporting durability of the rally amid secular AI infrastructure growth.

AI cycle still early/durable, see TAM 3x to $1.7Tn by 2030E

We retain high conviction in continued AI infra strength, driven by: (1) 3–5x YoY sales growth at frontier labs, (2) improving AI monetization, exponential token growth (7x YoY at Google), and continued disruption fears among hyperscalers, (3) tight supply with near-full utilization of all deployed infra, and (4) underappreciated sovereign, enterprise and industrial demand. We forecast AI TAM tripling to ~$1.7T by 2030E.

Positioning favors compute, memory, analog, semicaps

Our preferred exposure remains: **1) Compute** (NVDA, AVGO, AMD), **2) Memory** (MU), **3) Analog** (ADI, TXN), **4) Semicap equipment** (LRCX, KLAC), **5) EDA** (CDNS), **6) Interconnects** (MRVL), and **7) Consumer**. Valuations are supportive with several leaders trading below mid-cycle multiples. Memory continues to be the "pain trade" but worth staying engaged at least as long as QoQ DRAM memory pricing continue to expand (expected consistently through Q4'26 by our colleague Simon Woo, as explained in his recent note, linked here). Semicaps at premium PE but rare in potential for accelerating 20%+ annual sales into CY27/28 as more cleanroom space becomes available for greenfield memory additions and continued logic growth (incl. Terafab).

Analog: lower beta AI with cyclical upside

Analog names offer a more defensive way to play AI, with only ~10% average revenue tied to the theme (power, test/measurement, server control, optics), implying lower beta vs. core compute. At the same time, fundamentals are supported by non-AI drivers: aero/defense strength, a recovery in China EV/auto, global fab and data center buildouts, and emerging edge/physical AI demand. We flag: 1) ADI (~20% data center exposure, best-in-class FCF generation), 2) TXN (largest incremental US-capacity, model leverage), 3) ON (emerging AI power pipeline, most op. leverage, China EV recovery, Sep analyst day catalyst), and 4) MCHP (aero/defense exposure, emerging data center PCIe pipeline). For details on AI power refer to our note published earlier today.

Accelerators dominate, CPU bulls overstate their value

While CPUs gain relevance in orchestration, their economic share remains modest (~6–7% of AI TAM), comparable to share captured by many other switching, interconnect and networking components. Pricing ($3–5K) is a fraction of accelerators ($20–60K), and bundling by accelerator vendors compresses merchant CPU opportunity. We expect multiple CPU announcements at Computex in early June, including more details on NVDA's $200bn CY30 TAM. In our view NVDA, AMD, memory and foundries remain preferred ways to gain leverage to agentic CPU growth.

Key related reports:

1) AI 2030: Stronger for longer for compute, memory, networking

2) Watts to Tokens: AI Power Semis and the Transition to 800V Data Centers

3) Agentic CPU: analyzing x86 vs. ARM opportunities

4) Semiconductor Capital Equipment: Wafer Fab Equipment: 2025 market share analysis and industry update

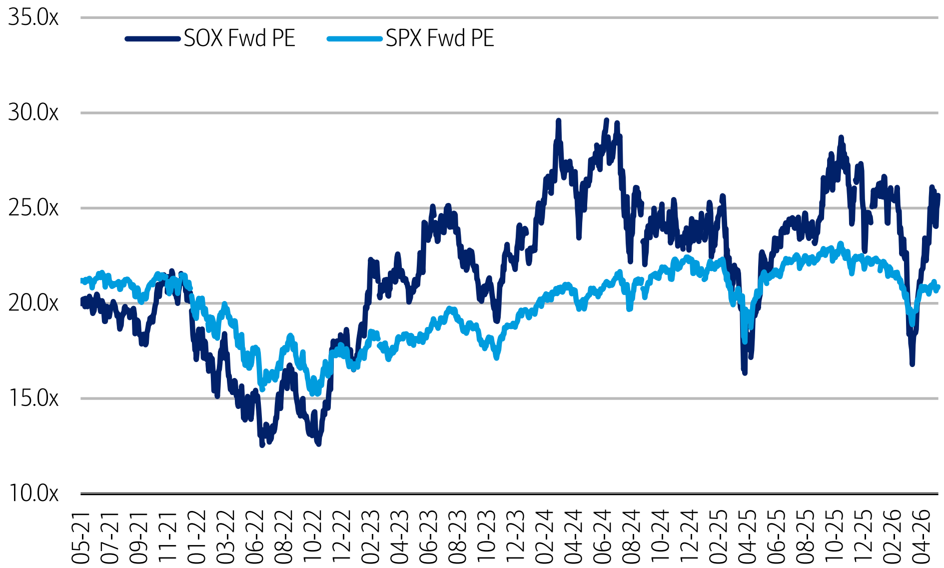
5) EDA update: 2030 EPS power analysis

Refer to important disclosures on page 15 to 18. Analyst Certification on page 14. Price Objective Basis/Risk on page 11.

SOX driven by earnings, not PE

The SOX index is currently trading at a 25.6 PE on next twelve month (NTM) consensus estimates, about the same level as the start of the yea, and below its prior 30x high.

Exhibit 1: SOX forward PE multiple relatively unchanged YTD, and below prior 30x high
NTM PE for SOX and S&P 500 index (SPX)



Source: Bloomberg, BofA Global Research Estimates

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Many chip stocks trading at compelling valuations, below eps growth (<1x PEG)

Compute/Memory/EDA: NVDA, MU, CRDO below historical PE and <1x PEG

Exhibit 2 summarizes consensus sales and EPS compounded annual growth rates, PE to earnings growth ratio (PEG, ratio of CY27E PE to CY25-27E EPS CAGR). Data indicates NVDA, MY, CRDO as trading <1x PEG and below their historical PE multiples.

Exhibit 2: Compute/memory our favorite sub-sector with several stocks trading below historical valuations and <1x PEG
Forward multiples and sales/EPS growth rates for leading compute and memory stocks, green shading indicates <1x PEG

		PE		Historical	Above/Below		CY25-27E		CY27E
Ticker	Mkt Cap	CY26E	CY27E	5-yr	CY26E	CY27E	Sales CAGR	EPS CAGR	PEG
NVDA	$5,211.0	25.2x	17.5x	33.6x	-25%	-48%	61%	62%	0.28x
AVGO	$1,960.8	32.8x	21.7x	20.5x	60%	6%	59%	64%	0.34x
AMD	$762.3	64.6x	36.3x	30.2x	114%	20%	46%	76%	0.48x
MU	$846.9	8.8x	6.9x	10.1x	-13%	-31%	100%	170%	0.04x
INTC	$602.3	108.3x	76.7x	24.9x	334%	207%	11%	93%	0.83x
ARM	$325.5	153.1x	109.7x	71.5x	114%	53%	25%	27%	4.00x
CDNS	$103.0	47.0x	39.9x	42.0x	12%	-5%	15%	14%	2.75x
SNPS	$100.5	35.5x	29.8x	35.2x	1%	-15%	18%	14%	2.08x
MRVL	$176.2	53.0x	37.1x	28.3x	87%	31%	34%	38%	0.98x
ALAB	$52.6	102.3x	74.1x	73.2x	40%	1%	60%	50%	1.48x
CRDO	$40.3	49.5x	35.0x	65.1x	-24%	-46%	69%	63%	0.55x
COHR	$73.9	56.0x	39.1x	18.8x	198%	108%	32%	49%	0.80x
LITE	$73.7	72.4x	40.2x	18.3x	296%	120%	83%	136%	0.30x
LSCC	$19.6	79.0x	60.7x	42.5x	86%	43%	34%	50%	1.22x
AMBA	$3.8	123.9x	88.3x	96.5x	29%	-8%	13%	27%	3.25x

Source: Bloomberg, BofA Global Research Estimates

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Semicap Equipment: valuations extended but growth durability strong

Semicap equipment stocks are currently trading largely above 1x PEG, with exception of AMAT, TER, MKSI and AEIS, though none of them are below historical multiples. We are still very positive on semicap stocks since they could be in an extended growth cycle (20% annual sales growth for the next 2-3 years versus 10% historical growth-rate), driven by strong investment in leading-edge logic, memory and packaging.

Exhibit 3: Semicap equipment stocks somewhat more extended than compute, but justified by durable growth visibility
Forward multiples and sales/EPS growth rates for leading semicap equipment stocks, green shading indicates <1x PEG

		PE		Historical	Above/Below		CY25-27E		CY27E
Ticker	Mkt Cap	CY26E	CY27E	5-yr	CY26E	CY27E	Sales CAGR	EPS CAGR	PEG
LRCX	$381.9	44.5x	34.9x	20.4x	118%	72%	26%	34%	1.04x
AMAT	$343.1	33.2x	25.8x	18.4x	80%	40%	23%	33%	0.77x
KLAC	$246.7	43.5x	33.8x	21.2x	105%	59%	20%	26%	1.33x
TER	$56.1	49.7x	35.8x	26.4x	89%	36%	32%	59%	0.61x
NVMI	$16.0	48.0x	39.3x	26.9x	78%	46%	21%	22%	1.79x
MKSI	$21.7	27.5x	21.7x	15.0x	83%	44%	18%	37%	0.59x
AEIS	$12.4	34.8x	27.6x	19.6x	77%	41%	20%	35%	0.78x
CAMT	$7.8	47.9x	36.8x	25.4x	89%	45%	19%	18%	2.03x
ACLS	$4.8	40.9x	32.4x	16.8x	144%	93%	5%	13%	2.50x

Source: Bloomberg, BofA Global Research Estimates

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Analog stocks: at premium but benefit from emerging growth drivers in AI

Analog stocks typically prove defensive, but now also participating in global buildout of AI data centers, and from cyclical recovery in aero/defense and automotive markets.

Exhibit 4: Analog stocks also trading at premium valuations supported by AI, aero/defense growth drivers
Forward multiples, growth rates and PEG ratios, with green shading indicating <1x PEG

		PE		Historical	Above/Below		CY25-27E		CY27E
Ticker	Mkt Cap	CY26E	CY27E	5-yr	CY26E	CY27E	Sales CAGR	EPS CAGR	PEG
TXN	$281.4	40.0x	33.6x	24.2x	65%	39%	15%	25%	1.36x
ADI	$193.4	30.4x	26.1x	24.7x	23%	6%	22%	35%	0.75x
MCHP	$50.6	32.6x	24.4x	18.3x	78%	33%	26%	81%	0.30x
NXPI	$79.9	21.6x	18.0x	15.8x	37%	14%	13%	22%	0.82x
MTSI	$29.4	69.8x	55.2x	29.1x	140%	90%	27%	37%	1.48x
ON	$45.5	37.6x	27.3x	16.7x	126%	64%	9%	35%	0.79x
ALGM	$8.6	52.5x	34.0x	33.3x	58%	2%	18%	77%	0.44x

Source: Bloomberg, BofA Global Research Estimates

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Consumer semis: negatively impacted by rising memory prices, competition

Consumer semis are being impacted by rising memory prices and competition (Qualcomm share loss at Apple, for instance). In some case, edge AI is emerging as an important long-term growth driver such as for Ambiq.

Exhibit 5: Consumer semis trading at unfavorable valuations and well above EPS growth rates
Forward multiples and growth-rates for consumer exposed semis

		PE		Historical	Above/Below		CY25-27E		CY27E
Ticker	Mkt Cap	CY26E	CY27E	5-yr	CY26E	CY27E	Sales CAGR	EPS CAGR	PEG
QCOM	$251.0	24.1x	21.9x	13.4x	80%	64%	-2%	-5%	-4.2x
SWKS	$12.4	16.9x	15.6x	13.5x	26%	16%	1%	-5%	-3.1x
GFS	$47.0	44.4x	33.7x	24.2x	84%	39%	9%	22%	1.6x
AMBQ	$1.7	0.0x	0.0x	0.0x			45%	-63%	0.0x

Source: Bloomberg, BofA Global Research Estimates

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AI 2030 TAM Outlook ~$1.7Tn+

We see the AI capex cycle as sustainable as hyperscaler spending is increasingly supported by: 1) frontier lab revenue acceleration, 2) contracted cloud/backlog growth, and 3) token-intensive agentic workloads that convert usage into compute demand. A key risk remains execution (power, data center construction, financing, and component supply) but we see surging demand outpacing the capacity being built resulting in sustainably strong demand in the mid-term.

Of the overall global IT spend of ~$6.3Tn today, we believe **data center systems** to represent $767bn across both AI and non-AI. By CY30, we expect TAM to grow toward ~$2.1Tn, growing at +32% CAGR CY25-30 and outpacing overall IT spend at +9% CAGR.

For **AI data center systems** specifically, we forecast TAM growing to $1.7Tn+ by CY30 from $264bn in CY25, with AI servers representing ~75% of TAM at $1.3Tn, followed by networking at ~20% of TAM at $316bn, and storage at ~5% of TAM at $82bn. For **non-AI data center systems**, we see TAM growth of a modest +8% CAGR.

Exhibit 6: We see AI Data Center Systems TAM to reach ~$1.7Tn by CY30, +45% CAGR, with AI accelerators representing ~$1.2Tn within that
Data Center Systems TAM Breakout – AI vs. non-AI

TAM ($bn)	2022	2023	2024	2025	2026E	2027E	2028E	2029E	2030E	CAGR '25-'30
Overall IT Spend (1)	**$4,594.2**	**$4,693.0**	**$5,038.7**	**$5,563.8**	**$6,316.5**	**$6,985.3**	**$7,468.4**	**$8,085.5**	**$8,726.2**	**9%**
Data Center Systems TAM ($bn) (2)	**$227.1**	**$237.6**	**$333.5**	**$505.6**	**$767.2**	**$1,122.0**	**$1,487.4**	**$1,803.9**	**$2,064.3**	**32%**
YoY (%)		5%	40%	52%	52%	46%	33%	21%	14%	
AI Data Center Systems TAM ($bn)	**$23.0**	**$63.2**	**$160.1**	**$263.6**	**$545.6**	**$863.8**	**$1,189.0**	**$1,485.1**	**$1,714.7**	**45%**
YoY (%)		174%	153%	65%	107%	58%	38%	25%	15%	
AI % of Overall IT Spend (1)	0.5%	1.3%	3.2%	4.7%	8.6%	12.4%	15.9%	18.4%	19.7%	
AI % of Data Center Systems TAM (2)	10.1%	26.6%	48.0%	52.1%	71.1%	77.0%	79.9%	82.3%	83.1%	
AI Servers	**$16.3**	**$49.5**	**$130.4**	**$215.5**	**$423.1**	**$671.9**	**$924.8**	**$1,147.6**	**$1,317.0**	**44%**
AI CPUs	$1.2	$2.1	$3.9	$8.8	$22.6	$39.1	$55.7	$75.2	$95.7	61%
AI Accelerators	**$14.3**	**$45.0**	**$120.2**	**$196.5**	**$381.1**	**$603.2**	**$830.1**	**$1,026.1**	**$1,170.6**	**43%**
HBM	$1.6	$4.2	$17.4	$34.5	$76.8	$105.5	$120.5	$139.9	$168.3	37%
HBM (% of Accelerators)	*11%*	*9%*	*14%*	*18%*	*20%*	*17%*	*15%*	*14%*	*14%*	
Other (DDR/SSD/motherboard/power/etc.)	$0.8	$2.4	$6.2	$10.3	$19.4	$29.5	$39.0	$46.3	$50.7	38%
AI Networking	**$5.6**	**$10.4**	**$21.6**	**$34.6**	**$95.3**	**$150.8**	**$207.5**	**$266.8**	**$316.1**	**56%**
AI Switching (Back/Front-End)	$2.2	$4.6	$8.8	$12.5	$30.9	$52.6	$71.2	$103.9	$128.7	59%
AI SmartNIC	$0.9	$2.0	$3.3	$4.8	$23.5	$39.7	$59.0	$68.7	$77.6	75%
AI Connectivity/Other Networking	$2.5	$3.8	$9.5	$17.4	$40.9	$58.5	$77.4	$94.2	$109.8	45%
Optical	$1.9	$3.4	$8.6	$15.3	$35.8	$49.5	$62.3	$76.0	$87.7	42%
Electrical/Copper	$0.6	$0.4	$0.9	$2.1	$5.1	$9.0	$15.1	$18.2	$22.1	61%
DAC	$0.5	$0.4	$0.6	$0.8	$1.3	$1.8	$2.1	$2.4	$2.6	26%
ACC	$0.0	$0.0	$0.0	$0.0	$0.4	$1.2	$2.1	$3.1	$6.0	180%
AEC	$0.1	$0.1	$0.2	$1.2	$3.4	$6.0	$10.9	$12.8	$13.6	62%
AI Storage	**$1.1**	**$3.2**	**$8.2**	**$13.5**	**$27.2**	**$41.1**	**$56.6**	**$70.7**	**$81.7**	**43%**
Non-AI Data Center TAM ($bn)	**$204.1**	**$174.4**	**$173.4**	**$242.0**	**$221.7**	**$258.2**	**$298.4**	**$318.8**	**$349.6**	**8%**
YoY (%)		-15%	-1%	40%	-8%	16%	16%	7%	10%	

Source: BofA Global Research estimates, Gartner, Mercury Research, IDC, LightCounting, 650 Group

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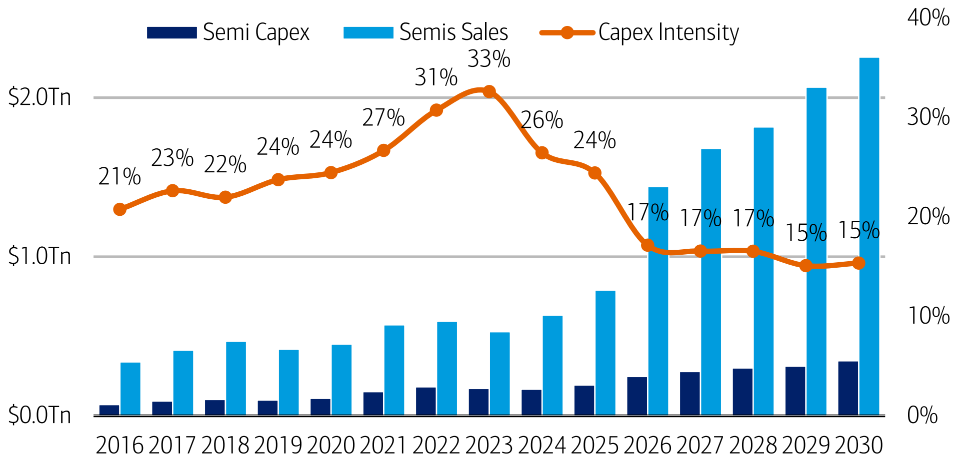
Exhibit 7: Semis capex intensity is expected to fall from mid 20s to mid teens suggesting supply constraints may persist
Total semis sales vs. semiconductor capex



Source: BofA Global Research, SIA, Gartner, Bloomberg

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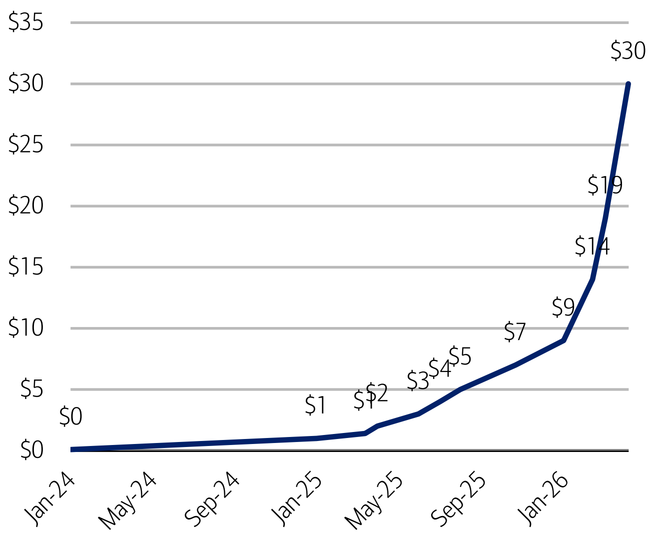
Frontier lab growth is becoming large enough to absorb compute

OpenAI and Anthropic provide the clearest evidence that AI demand is scaling faster than traditional enterprise software adoption curves. OpenAI reportedly expects revenue to increase from $13bn in 2025 to $30bn in 2026, $62bn in 2027, and $283bn by 2030, while projecting cumulative compute spend of ~$665bn through 2030. OpenAI's higher revenue and compute projections strengthen the AI demand thesis, though lower margins and higher cash burn remain a profitability challenge for the sector. BofA's Justin Post sees OpenAI revenue reaching $284bn by 2030, with agentic AI contributing roughly 20% of 2030 revenue, supported by agent packages priced from $1,500 to $20,000 per user per month.

Exhibit 8: Anthropic's ARR has inflected to $30bn as of Apr.'26
Anthropic's annualized revenue run rate ($bn)



Source: Anthropic, CNBC, Inc.com, CNBC, PYMNTS, Bloomberg

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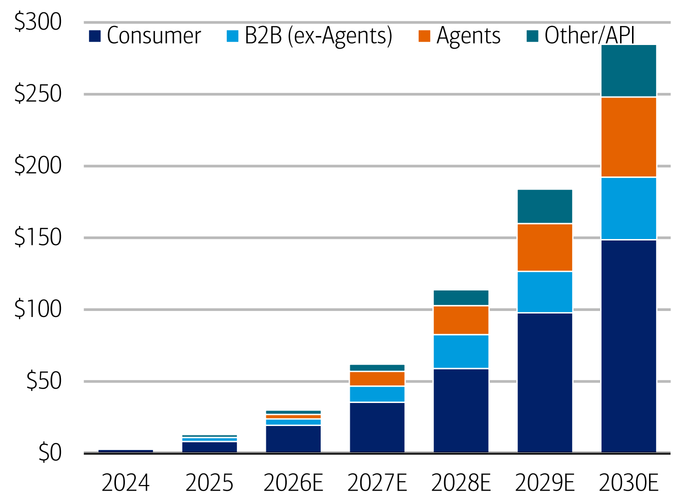
Exhibit 9: Total OpenAI revenue is expected to reach $284bn in 2030E, with $56bn coming from agents
OpenAI segment revenue, 2024-30E



Source: BofA Global Research estimates, The Information

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Anthropic is a near-term proof point for AI workload monetization with annualized revenue run rate surpassing $19bn, up $17bn YoY and $10bn from the end of 2025.

Anthropic's ARR increase from $9bn in December to $19bn in March could suggest a $2.5bn+ QoQ revenue increase, and that AWS could see up to $1bn QoQ revenue contribution related to Anthropic depending on workload share and training cost capture. This creates a direct bridge from frontier lab ARR to cloud capacity demand and therefore to accelerator, HBM, networking, custom silicon, and power/thermal content.

Token velocity extends the cycle beyond training

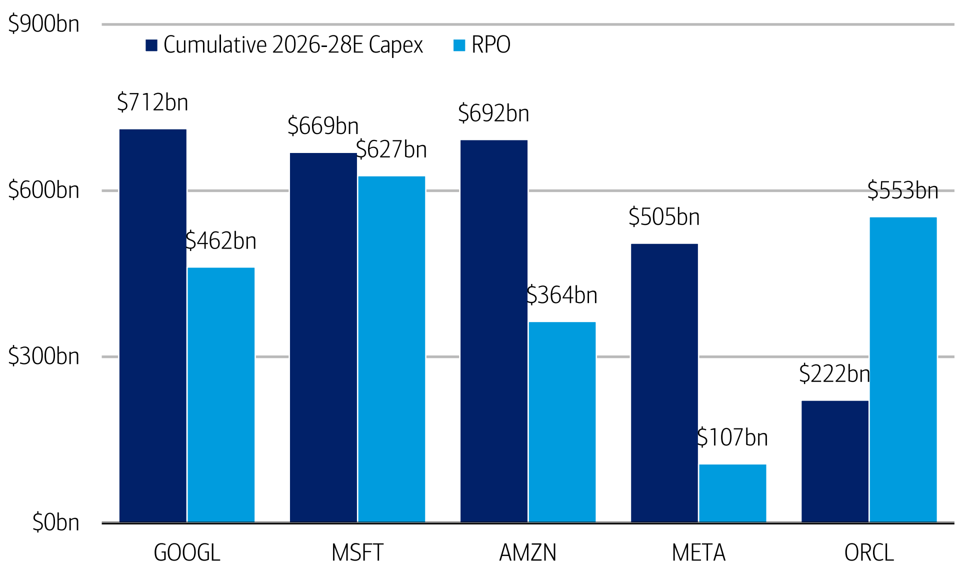
Agentic AI workflows can generate 10x to 1,000x more tokens per workflow than a chat interaction, and that token consumption is becoming the primary driver of compute demand. Tokens also change cloud monetization from seat-based economics to usage-based economics, giving cloud platforms a clearer pathway to monetize agent adoption. Efficiency gains should not be viewed simply as a capex headwind; lower cost per token can expand usage, similar to prior compute elasticity cycles. Inference, post-training, synthetic data generation, agent orchestration, and enterprise workflow automation can sustain demand even after the initial training-cluster buildout matures.

Hyperscaler capex is increasingly backed by commitments and backlog

Microsoft disclosed nearly $627bn of commercial RPO, up ~99% YoY, including an incremental $250bn OpenAI contracted for Azure services, while also planning to increase total AI capacity by >80% this year and roughly double its data center footprint over two years.

Exhibit 10: Much of hyperscaler capex is supported by RPO

Cumulative CY26-28E capex estimates vs. current RPO across hyperscalers



Source: BofA Global Research, Company Reports, Bloomberg

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Amazon disclosed AWS backlog of $364bn, explicitly excluding the recent $100bn+ Anthropic deal, and said Trainium revenue commitments exceed $225bn; AWS also reached a $150bn annualized revenue run-rate, with AI services contributing >$15bn annualized in their first three years.

Alphabet said Google Cloud revenue grew 63% to more than $20bn, backlog nearly doubled QoQ to >$460bn, and genAI model product revenue grew nearly 800% YoY. Meta is not a cloud resale model, but its 2026 capex guide of $125-$145bn, Q1 capex of $19.8bn, and $107bn increase in multiyear infrastructure commitments underscore that internal AI compute demand remains material. Oracle disclosed $553bn of RPO in fiscal

Q3 2026, up 325% YoY and up $29bn QoQ, with most of the Q3 RPO increase related to large-scale AI contracts.

Global Semis Forecast

We model CY26 semis/core semis (ex-memory) growth of +83%/+25% YoY, led by growth in data center. By end market, we model (1) compute and storage up +43% YoY (continued server strength); (2) wireless comms down -9% YoY (smartphone unit headwind); (3) auto sales up +3% on sluggish units but improving content; (4) Industrial up +16% YoY on improved end demand and inventory dynamics since 2H25; (5) consumer down -6% YoY; and (6) wired comms up +28% YoY on data center buildout.

Exhibit 11: We model semis/core semis sales up +83%/+25% YoY in CY26E
Summary of BofA Semiconductor forecasts by end market

Revenue ($mn)	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E	2029E	2030E	CAGR '15-25	CAGR '19-25	CAGR '25-30
Total Semis	$451	$572	$594	$528	$633	$790	$1,441	$1,681	$1,816	$2,067	$2,255	9.0%	11.2%	23.3%
YoY%	7.7%	27.0%	3.8%	(11.0%)	19.7%	24.8%	82.5%	16.6%	8.0%	13.8%	9.1%			
Memory	$128	$170	$150	$94	$170	$220	$730	$860	$898	$1,065	$1,193	11.0%	11.8%	40.3%
YoY%	13.5%	33.4%	(11.9%)	(37.4%)	81.3%	28.9%	232.6%	17.8%	4.4%	18.6%	12.1%			
Core Semis (ex-memory)	$323	$402	$444	$435	$463	$570	$711	$821	$918	$1,002	$1,062	8.3%	10.9%	13.2%
YoY%	5.6%	24.4%	10.5%	(2.1%)	6.4%	23.3%	24.7%	15.5%	11.8%	9.2%	6.0%			
Compute and Storage	$108	$128	$154	$167	$207	$303	$432	$521	$595	$660	$703	13.8%	21.0%	18.3%
YoY%	11.2%	19.1%	20.3%	8.4%	23.9%	46.5%	42.5%	20.6%	14.3%	10.8%	6.6%			
PCs	$56	$68	$59	$52	$57	$61	$57	$58	$61	$64	$66	4.3%	4.3%	1.5%
YoY%	16.5%	22.3%	(12.4%)	(11.8%)	9.3%	7.0%	(7.9%)	3.0%	4.9%	4.5%	3.5%			
Servers (silicon only)	$27	$32	$63	$80	$121	$213	$346	$432	$503	$564	$605	28.5%	41.4%	23.2%
YoY%	2.2%	16.9%	97.3%	27.5%	51.6%	75.6%	62.6%	25.0%	16.3%	12.1%	7.2%			
Wireless Communications	$85	$104	$111	$94	$93	$91	$83	$85	$89	$93	$96	3.3%	2.9%	1.2%
YoY%	11.1%	22.3%	6.8%	(15.8%)	(0.5%)	(2.4%)	(8.5%)	2.3%	5.1%	4.0%	3.6%			
Smartphone	$71	$88	$91	$77	$80	$78	$71	$72	$76	$79	$82	3.9%	3.5%	0.9%
YoY%	12.3%	23.7%	3.2%	(15.4%)	3.6%	(2.0%)	(9.4%)	2.0%	5.1%	4.0%	3.5%			
Wireless Infrastructure	$14	$16	$20	$16	$13	$13	$12	$13	$13	$14	$14	2.9%	(0.7%)	2.8%
YoY%	5.0%	14.7%	27.1%	(17.5%)	(20.0%)	(5.0%)	(3.0%)	4.0%	5.0%	4.0%	4.0%			
Automotive	$34	$46	$49	$59	$53	$52	$54	$59	$66	$71	$76	5.6%	5.4%	8.0%
YoY%	(9.1%)	34.6%	5.4%	22.3%	(10.3%)	(3.0%)	3.4%	10.1%	11.3%	8.6%	6.6%			
Global Automotive Units (mn)	74.6	77.2	82.3	90.5	88.7	93.0	92.8	94.1	94.9	96.3	97.3	0.5%	0.8%	0.9%
YoY%	(16.1%)	3.5%	6.7%	9.9%	(2.0%)	4.9%	(0.2%)	1.4%	0.8%	1.5%	1.0%			
Auto semi content ($/LV) / Inv. Adj.	$459	$597	$590	$657	$602	$556	$577	$627	$692	$740	$781	5.1%	4.6%	7.0%
YoY%	8.4%	30.0%	(1.1%)	11.3%	(8.5%)	(7.5%)	3.7%	8.6%	10.4%	7.0%	5.5%			
Industrial & Other	$43	$54	$62	$59	$45	$50	$58	$63	$68	$72	$74	4.1%	2.1%	8.3%
YoY%	(2.6%)	26.5%	15.3%	(4.8%)	(24.3%)	10.8%	15.8%	9.9%	7.4%	5.2%	3.6%			
Automation	$10	$13	$15	$15	$12	$13	$13	$15	$17	$19	$22	6.2%	4.2%	11.0%
YoY%	(3.0%)	29.5%	17.0%	(1.0%)	(15.0%)	3.6%	4.1%	11.6%	13.2%	13.2%	13.2%			
Power/Energy	$6	$7	$9	$9	$8	$8	$8	$9	$9	$9	$10	6.8%	5.3%	4.5%
YoY%	(0.5%)	25.4%	22.0%	5.0%	(18.0%)	4.1%	4.1%	6.2%	4.1%	4.1%	4.1%			
Consumer	$35	$48	$48	$30	$31	$33	$31	$31	$32	$34	$35	1.1%	(0.0%)	1.2%
YoY%	6.5%	37.5%	0.1%	(37.1%)	3.4%	4.7%	(6.0%)	0.2%	3.0%	5.6%	3.6%			
TVs	$10	$14	$14	$11	$11	$11	$11	$11	$11	$12	$12	0.3%	2.8%	1.9%
YoY%	10.5%	37.1%	1.8%	(21.7%)	(4.0%)	2.1%	(3.2%)	3.9%	3.0%	3.0%	3.0%			
Video console SoCs (Gaming)	$3	$6	$7	$7	$3	$3	$3	$3	$3	$4	$4	6.5%	14.5%	6.3%
YoY%	102.2%	89.9%	26.2%	(4.3%)	(57.1%)	13.0%	(9.9%)	(0.7%)	8.9%	29.0%	7.7%			
Wired Communications	$18	$21	$20	$25	$33	$42	$54	$62	$68	$73	$77	9.8%	15.2%	12.9%
YoY%	1.0%	17.0%	(8.3%)	26.9%	32.8%	28.1%	27.9%	15.5%	9.2%	7.2%	5.8%			
Ethernet/Network switch	$5	$5	$6	$9	$13	$17	$24	$30	$33	$36	$38	12.3%	22.6%	17.2%
YoY%	(3.8%)	11.9%	15.0%	45.0%	40.0%	35.0%	40.0%	22.0%	12.0%	9.0%	6.0%			
Optical Equipment	$4	$5	$5	$6	$9	$12	$15	$18	$19	$21	$22	18.4%	20.5%	13.9%
YoY%	9.8%	11.8%	5.0%	30.0%	35.0%	35.0%	30.0%	15.0%	10.0%	8.0%	8.0%			

Source: BofA Global Research, Mercury Research, Gartner, Omdia, SIA

BofA GLOBAL RESEARCH

By device type, we see CY26 memory sales driven by both DRAM (+256% YoY) and NAND (+205% YoY).

Ex-memory, microprocessors (MPUs) strong (+10% YoY) on hyperscaler consumption modestly offset by weak PC units, and logic particularly strong (+33% YoY) on AI accelerator-related demand. We also model industrial-centric markets (MCUs, Analog) seeing recovery following inventory digestion throughout 2024 and 1H25. In CY26, we model other markets (discretes, optos, sensors) to generally return to healthy growths (+25% YoY) as well, particularly driven by data center-related optoelectronic demands.

Exhibit 12: We model memory, logic, microcomponents driving semiconductor growth
Summary of BofA Semis Forecast by device type

Revenue ($bn)	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E	2029E	2030E	CAGR '15-25	CAGR '19-25	CAGR '25-30
Total Semis	$451	$572	$594	$528	$633	$790	$1,441	$1,681	$1,816	$2,067	$2,255	9.0%	11.2%	23.3%
YoY%	7.7%	27.0%	3.8%	(11.0%)	19.7%	24.8%	82.5%	16.6%	8.0%	13.8%	9.1%			
Memory	$128	$170	$150	$94	$170	$220	$730	$860	$898	$1,065	$1,193	11.0%	11.8%	40.3%
YoY%	13.5%	33.4%	(11.9%)	(37.4%)	81.3%	28.9%	232.6%	17.8%	4.4%	18.6%	12.1%			
DRAM	$65	$92	$78	$47	$88	$134	$476	$575	$610	$731	$835		13.5%	44.2%
YoY%	4.6%	40.9%	(15.7%)	(39.1%)	85.9%	52.2%	255.9%	20.8%	6.1%	19.8%	14.2%			
NAND	$59	$73	$67	$42	$78	$81	$247	$277	$280	$325	$349		9.8%	33.9%
YoY%	26.4%	25.3%	(8.2%)	(36.9%)	84.0%	3.7%	205.3%	11.9%	1.1%	16.3%	7.3%			
Core Semis (ex-memory)	$323	$402	$444	$435	$463	$570	$711	$821	$918	$1,002	$1,062	8.3%	10.9%	13.2%
YoY%	5.6%	24.4%	10.5%	(2.1%)	6.4%	23.3%	24.7%	15.5%	11.8%	9.2%	6.0%			
Analog	$56	$74	$89	$81	$80	$87	$99	$108	$116	$121	$125	6.7%	8.2%	7.6%
YoY%	3.2%	33.1%	20.1%	(8.8%)	(2.0%)	8.9%	13.9%	9.4%	7.1%	4.7%	3.3%			
Microcomponents	$70	$81	$79	$77	$79	$85	$93	$101	$107	$113	$117	3.3%	4.1%	6.7%
YoY%	4.9%	15.5%	(1.5%)	(3.5%)	3.7%	6.8%	10.3%	8.6%	5.9%	5.1%	3.7%			
Microprocessors	$51	$56	$51	$45	$53	$60	$69	$77	$85	$88	$90	3.4%	3.9%	8.3%
YoY%	6.5%	10.4%	(9.5%)	(11.3%)	17.1%	14.0%	15.2%	10.4%	10.7%	3.6%	2.0%			
Microcontrollers	$18	$23	$27	$29	$24	$23	$26	$29	$31	$35	$39	4.2%	4.8%	11.2%
YoY%	3.3%	25.0%	20.8%	7.6%	(19.2%)	(2.4%)	12.0%	11.8%	7.6%	11.3%	13.2%			
Logic	$118	$154	$176	$178	$213	$301	$400	$476	$544	$605	$648	12.7%	18.9%	16.6%
YoY%	11.1%	30.2%	14.2%	1.4%	19.1%	41.7%	32.7%	19.1%	14.3%	11.3%	7.1%			
Others (Discretes, optos, sensors)	$79	$93	$100	$98	$91	$98	$119	$136	$151	$163	$172	4.9%	3.6%	11.9%
YoY%	0.3%	17.4%	7.1%	(1.2%)	(7.5%)	7.5%	21.9%	14.1%	11.2%	7.8%	5.2%			

Source: BofA Global Research, Mercury Research, Gartner, Omdia, SIA

BofA GLOBAL RESEARCH

Looking at our forecasts versus BofA Global semis bottom-up estimates, we are generally in line with the growth trajectory for CY26E/CY27E ex-NVDA (which now realizes significant revenue from system sales growth and software). Modest outperformance versus industry reflects continued industry trends of industry consolidation and share gains by top vendors.

Exhibit 13: Our Semis industry outlook generally aligns with bottoms-up company estimates
Summary of BofA semis forecasts versus bottoms-up estimates

Semis ex-mem Forecast ($bn)	2025	2026E	2027E	2028E	2029E	2030E
BofA Semi Ex-Memory Forecast	$570	$711	$821	$918	$1,002	$1,062
YoY (%)	*23.3%*	*24.7%*	*15.5%*	*11.8%*	*9.2%*	*6.0%*
BofA Coverage Bottoms-Up Sales	$539	$767	$980	$1,184	$1,327	$1,466
YoY (%)	*26.8%*	*42.3%*	*27.9%*	*20.7%*	*12.1%*	*10.5%*
BofA Coverage Bottoms-Up Ex-NVDA Sales	$323	$407	$515	$625	$701	$790
YoY (%)	*9.6%*	*25.9%*	*26.7%*	*21.4%*	*12.2%*	*12.7%*

Source: BofA Global Research estimates, SIA, company reports

BofA GLOBAL RESEARCH

Exhibit 14: 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$ 467.51	C-1-9
ADI	ADI US	Analog Devices	US$ 397.07	B-1-7
AVGO	AVGO US	Broadcom	US$ 414.14	C-1-7
CDNS	CDNS US	Cadence	US$ 373.59	B-1-9
KLAC	KLAC US	KLA Corp	US$ 1888.38	B-1-7
LRCX	LRCX US	Lam Research	US$ 305.35	C-1-7
MRVL	MRVL US	Marvell	US$ 196.33	C-1-7
MCHP	MCHP US	Microchip	US$ 93.43	C-1-7
MU	MU US	Micron	US$ 751	C-1-7
NVDA	NVDA US	NVIDIA	US$ 215.33	C-1-7
ON	ON US	ON Semiconductor	US$ 116.2	C-1-9
TXN	TXN US	Texas Instr.	US$ 309.21	B-1-7

Source: BofA Global Research

BofA GLOBAL RESEARCH

Glossary

A/P: Advanced Packaging
ACC: Active Copper Cable
AEC: Active Electrical Cable
AI: Artificial Intelligence
AMD: Advanced Micro Devices
AOC: Active Optical Cable
API: Application Programming Interface
ARR: Annualized Revenue Run Rate
ASIC: Application-Specific Integrated Circuit
ASP: Average Selling Price
AT&T: American Telephone & Telegraph
AVGO: Broadcom Inc. ticker
AWS: Amazon Web Services
B2B: Business-to-Business
BOM: Bill of Materials
CAGR: Compounded Annual Growth Rate
CFO: Cash Flow from Operations
COHR: Coherent Corp. ticker
Comms: Communications
cons.: Consensus
CPO: Co-Packaged Optics
CPU: Central Processing Unit
CRDO: Credo Technology Group ticker
CW: Continuous Wave
CXMT: ChangXin Memory Technologies
DAC: Direct Attach Copper
DC: Data Center
DDR: Double Data Rate memory
DRAM: Dynamic Random-Access Memory
DSP: Digital Signal Processor
EBIT: Earnings Before Interest and Taxes
EML: Electro-absorption Modulated Laser
EPS: Earnings Per Share
ex- / excl.: Excluding

FCF: Free Cash Flow
FLOPs: Floating Point Operations per Second
GB: Gigabyte
genAI: Generative Artificial Intelligence
GOOGL: Alphabet Inc. ticker
GPU: Graphics Processing Unit
GW: Gigawatt
HBM: High Bandwidth Memory
IDC: International Data Corporation
incl.: Including
infra: Infrastructure
Inv. Adj.: Inventory Adjustment
IPO: Initial Public Offering
IT: Information Technology
JV / JVs: Joint Venture / Joint Ventures
KV: Key-Value, as in KV cache
LITE: Lumentum Holdings ticker
LPO / LRO: Linear Pluggable Optics / Linear Receiver Optics
LPDDR: Low Power Double Data Rate memory
LPU: Language Processing Unit
LT: Long Term
LV: Light Vehicle
MCU: Microcontroller Unit
mn: Million
MPU: Microprocessor Unit
MRVL: Marvell Technology ticker
MSFT: Microsoft Corp. ticker
MTSI: MACOM Technology Solutions ticker
MU: Micron Technology ticker
NAND: NAND flash memory; “Not AND” logic-derived memory type
NIC: Network Interface Card
NVDA: NVIDIA Corp. ticker
NVFP4: NVIDIA Floating Point 4-bit format
OEM: Original Equipment Manufacturer
OpM: Operating Margin
P/B: Price-to-Book
P/E / PE: Price-to-Earnings
PC / PCs: Personal Computer / Personal Computers
PF: Photonic Fabric
pf-EPS: Pro forma Earnings Per Share
qtr: Quarter
RAM: Random Access Memory
ROI / ROIs: Return on Investment / Returns on Investment
RPO: Remaining Performance Obligation
S/D: Supply / Demand
SBC: Stock-Based Compensation
sh: Share
SIA: Semiconductor Industry Association
SiPho: Silicon Photonics
SK Hynix: SK Hynix Inc.
SmartNIC: Smart Network Interface Card
SoC / SoCs: System on Chip / Systems on Chip
SoP: Sum of Parts
SRAM: Static Random-Access Memory
SSD: Solid State Drive
TAM: Total Addressable Market
TBD: To Be Determined

TB: Terabyte
TIA / TIAs: Transimpedance Amplifier / Transimpedance Amplifiers
T-Mobile: T-Mobile US
TPU: Tensor Processing Unit
Tn: Trillion
TV / TVs: Television / Televisions
UHP: Ultra-High Performance
w/: With
w/o: Without
XPU: Generic processing unit term
YMTC: Yangtze Memory Technologies Co.
YoY: Year-over-Year

Price objective basis & risk

Advanced Micro Devices, Inc (AMD)
Our $500 PO is based on 42x our 2027E non-GAAP EPS. Our PO basis is now towards middle/upper range of historical 13x-58x, but is well supported by AMD's 50%+ annual EPS CAGR potential and its AI CPU/GPU share gain potentials, modestly offset by slower growth in cyclical PC/embedded/console markets.

Downside risks: 1) Execution on first rack-scale product (MI400 Series), 2) Timing/Magnitude of Middle East AI Projects, 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.

Upside risks are greater share gain potential in the PC and server processor market against competitors.

Analog Devices Inc. (ADI)
Our $460 PO is based on 30x CY2027E P/E. Our PO basis is above historical median of 26x but within the historical 14x-40x range and justified, in our view, based on ADI's best-in-class profitability and differentiated/secular comms exposure, offset by near-term concerns around cost inflation and tariffs.

Downside risks to our price objective: 1) Economic downturn, which could reduce demand for automotive, industrial products, impacting gross margins, especially given recent capital expenditures and higher fixed cost footprint. 2) Inability to realize the planned cost synergies from the Maxim combination. 3) Competition from larger vendors that have lower-cost production facilities. 4) Exposure to US-China tensions/tariffs via Chinese automotive market.

Broadcom Inc (AVGO)
Our $450 price objective for Broadcom is based on 26x CY27E P/E, in the middle of its 11x-41x historical range, still in-line with 1x-2x PEG framework for high-growth compute vendors, and 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.

Cadence (CDNS)
Our $400 PO is based on 42x CY27E P/E, in the lower half of its historical range of 33x-66x and justified in our view given the strategic importance of EDA in an increasingly fragmented global electronics supply chain offset by recent multiple compression in software.

Downside risks are: (1) Share loss in existing markets to primary competitors, (2) a broader economic downturn dampens semis R&D spending and corresponding spend on EDA tools and services, (3) escalation of US-China trade war limits CDNS' ability to sell to key customers, (4) semiconductor industry consolidation accelerates which could diminish customer spending power, (5) venture into adjacent system analysis market fails to meaningfully accelerate revenue growth and incremental investments suppress margin expansion.

KLA Corporation (KLAC)
We assign a $2100 PO based on 40x CY27E P/E. Our PO multiple is above the high end of its 12x-37x historical range justified by KLAC's leading profit margin, longer lead times (resulting in greater visibility), and less cyclical topline supports a slightly high multiple vs. semicap peers.

Downside risks to our PO are the cyclical nature of the semiconductor capital spending and its impact on earnings, competitive price and market share issues, ability to get new products and technologies into the market in a timely manner.

Lam Research Corp. (LRCX)
We assign a $330 PO based on 36x CY27E PE. Our PO basis is in the upper half of the f historical 9x-40x trading range justified by ongoing memory and leading-edge foundry/logic WFE cycle, high-teens EPS CAGR over time, etch/deposition product leadership, rising etch/deposition intensity, share gains, growing foundry/logic exposure over memory, improving prospects of NAND recovery, and robust FCF generation, offset by near-term concerns around cost inflation and tariffs.

Upside risks are tech inflections, F/L share gains, NAND upgrades.

Downside risks are slower than expected capital spending cycle, delay in memory capacity adds, market share loss in etch or clean segments, merger & integrations risk, macro headwinds, customer consolidation and China.

Marvell Technology, Inc. (MRVL)
Our $200 PO is based on 30x FY29E/CY28E pf-EPS (including stock-based comp). Our PO basis is modestly higher than 26x historical median but within 14x-47x range and is justified by an improvement in visibility for major customer ASIC projects, broadening AI portfolio across connectivity/switch/compute, and cyclical industry risks offset by ASIC upside, networking strength, and AEC/CPO/scale-up share gains.

Upside risks: 1) Faster than anticipated ramp/visibility in major custom ASIC projects, 2) Continued growth in DSP-based pluggable market, versus new LPO/LRO techs, 3) Share gains in emerging AEC/CPO/scale-up switch markets against incumbents.

Downside risks: 1) Loss of visibility in key custom ASIC projects, particularly in the next-gen 3nm/2nm chips at AWS and Microsoft, 2) Competition in AI compute, with merchant vendors continuing to proliferate and ASIC incumbent AVGO winning many of the large hyperscaler/AI customers, 3) cyclical industry risks including potential slowdown in legacy storage, enterprise networking, carrier markets.

Microchip (MCHP)

We assign a $122 PO based on 41x CY27 PE. This is well above MCHP's 5-year median of 18x and above peers trading at median of 30x but, in our view, is justified given that MCHP is earlier in the earnings recovery process after an extended downturn.

Upside risks to our PO: FCF returns that are the upper end of the peer group, but not fully reflected in the company's multiple which trades at a discount to peers, inflecting/greater FCF growth going forward as MCHP deleverages its balance sheet and accelerates returns to shareholders.

Downside risks to our PO: macro headwinds related to trade, increased competition capping any market share gains, tougher compares, GMs approaching the upper end of historical range and long term model.

Micron Technology, Inc (MU)
Our $950 PO is based on a sum-of-parts valuation that values: (1) traditional cyclical memory business at $710/sh at 3.1x CY27E P/B, toward the high-end range of MU's long-term range 0.8x-3.1x as we are potentially in a memory upcycle, and (2) AI HBM business at 27x CY27E PE, in-line with AI compute peer group median.

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 $350 PO is based on 26x CY27E PE ex cash, within NVDA's historical 25x-56x forward year PE range, which we believe is justified by NVDA's leading share in fast-growing AI compute/networking markets, offset by lumpiness in global AI projects, cyclical gaming market, and concerns around access to power.

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 6) Enhanced government scrutiny of NVDA's dominant market position in AI chips.

onsemi (ON)
Our PO of $138 PO is based on 32x 2027E P/E. Our PO basis is above the high end of ON's 9x-28x trading range and auto/industrial peers trading 14x-29x, justified, in our view, given potential for strong EPS and FCF recovery along with ongoing content and share gains in areas like silicon carbide and image sensing which should drive strong secular growth longer-term. We also think a higher multiple is justified given ON's rising AI exposure. We also think this valuation credits the company's restructuring initiatives that should streamline its manufacturing and opex base.

Downside risks to our PO are 1) macro/cyclical risks, given high exposure to automotive and industrial markets, make ON susceptible to any potential global trade tensions/tariffs, 2) prolonged COVID-19 headwinds limiting pace of automotive/industrial recovery, impacting utilization levels, 3) difficulty in ramping 300mm fabrication facility limiting gross margin improvement, 4) sustained elevated capex levels relative to peers.

Texas Instruments Inc. (TXN)
Our $370 PO is based on 40x CY27E P/E. Our PO basis is above the top of TXN's 17x-36x trading range, justified, in our view, given we are in the early stages of a restocking cycle while AI sales and mix are surging higher. We also like TXN's best-in-class FCF

generation and returns and incremental cash flow from US CHIPS Act grants offset by near term concerns around higher capital intensity.

Risks to our price objective: 1) Macro/cyclical risks given high exposure to automotive, industrial, and telco capex markets, also makes TXN susceptible to any potential global trade tensions/tariffs, 2) Increasing capex intensity and higher depreciation burden could be a headwind to gross margins, 3) Increased R&D spending pressure to maintain an edge versus the competition, 4) Inventory cycles and potential double ordering by customers that can often create mismatches between real supply and demand, 5) exposure to several mature markets such as PC and other consumer.

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 Energy Industries	AEIS	AEIS US	Duksan Jang
	Advanced Micro Devices, Inc	AMD	AMD US	Vivek Arya
	Allegro Microsystems	ALGM	ALGM US	Vivek Arya
	Analog Devices Inc.	ADI	ADI US	Vivek Arya
	Applied Materials, Inc.	AMAT	AMAT US	Vivek Arya
	Broadcom Inc	AVGO	AVGO US	Vivek Arya
	Cadence	CDNS	CDNS US	Vivek Arya
	Camtek	CAMT	CAMT US	Michael Mani
	Credo Technology	CRDO	CRDO 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
	Microchip	MCHP	MCHP US	Vivek Arya
	Micron Technology, Inc	MU	MU US	Vivek Arya
	MKS Instruments	MKSI	MKSI US	Michael Mani
	Nova	NVMI	NVMI US	Michael Mani
	NVIDIA Corporation	NVDA	NVDA US	Vivek Arya
	onsemi	ON	ON US	Vivek Arya
	Synopsys	SNPS	SNPS US	Vivek Arya
	Teradyne	TER	TER US	Vivek Arya
	Texas Instruments Inc.	TXN	TXN US	Vivek Arya
NEUTRAL				
	Ambarella	AMBA	AMBA US	Vivek Arya
	Ambiq Micro, Inc.	AMBQ	AMBQ US	Vivek Arya
	Arm Holdings	ARM	ARM US	Vivek Arya
	Astera Labs Inc	ALAB	ALAB US	Vivek Arya
	Coherent Corp	COHR	COHR US	Vivek Arya
	Lumentum Holdings	LITE	LITE US	Vivek Arya
	NXP Semiconductors NV	NXPI	NXPI US	Vivek Arya
UNDERPERFORM				
	Axcelis Technologies	ACLS	ACLS US	Duksan Jang
	GlobalFoundries	GFS	GFS US	Vivek Arya
	Intel	INTC	INTC US	Vivek Arya
	Lattice Semiconductor	LSCC	LSCC US	Duksan Jang
	Qualcomm	QCOM	QCOM US	Vivek Arya
	Skyworks Solutions, Inc.	SWKS	SWKS US	Vivek Arya
RVW				
	Wolfspeed Inc	WOLF	WOLF US	Vivek Arya

Disclosures

Important Disclosures

Equity Investment Rating Distribution: Electronics Group (as of 31 Mar 2026)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	34	56.67%	Buy	17	50.00%
Hold	10	16.67%	Hold	3	30.00%
Sell	16	26.67%	Sell	6	37.50%

Equity Investment Rating Distribution: Technology Group (as of 31 Mar 2026)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	234	58.50%	Buy	123	52.56%
Hold	90	22.50%	Hold	43	47.78%
Sell	76	19.00%	Sell	23	30.26%

Equity Investment Rating Distribution: Global Group (as of 31 Mar 2026)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	1993	55.76%	Buy	1186	59.51%
Hold	821	22.97%	Hold	509	62.00%
Sell	760	21.26%	Sell	400	52.63%

[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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