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KOREAN AMERICAN SEMICONDUCTOR ASSOCIATION IN SILICON VALLEY

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ASML: Short-Term Headwinds But A Long-Term Winner

Jan 2, 2025 Christopher Gray

Summary

- ASML's pullback offers a buying opportunity for long-term investors, based on its EUV lithography leadership and growing installed base revenue.
- High-NA EUV adoption by Intel, Samsung, SK Hynix, and TSMC will drive revenue and EUV system sales will grow gross margin.
- AI demands, along with increased electrification and autonomous driving, necessitate energy-efficient chips and further transistor scaling, positioning EUV technology as a key enabler.
- The outlook for 2030 remains unrevised even with the downward revision for 2025.



ASML in Veldhoven. Pixelbizz

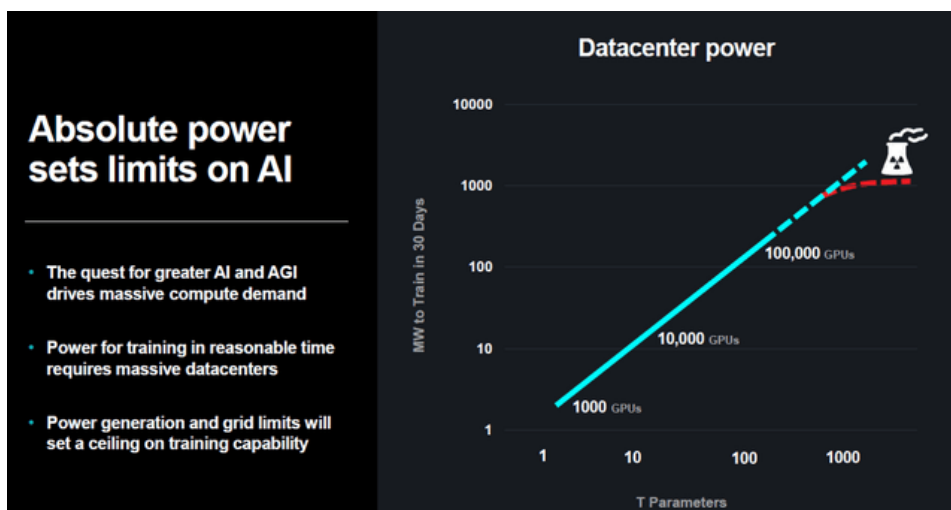
Introduction

ASML (NASDAQ:ASML) and the entire semiconductor market has gone through a significant pullback with ASML dropping about 40% from its all-time highs before recovering to its current level 35% down from its all-time high after the AI fueled hype helped propel it and the entire semiconductor industry upwards. This provides an opportunity for long-term investors to buy in at a more reasonable price point. ASML's truly unique technology will allow it to remain the sole EUV lithography leader for decades to come. Providing both low NA and high NA EUV lithography machines to chip manufacturers, as well as DUV lithography and e-beam inspection tools.

In this article, I will explore some of the critical issues the semiconductor market is facing in the medium term and the solutions to these issues to continue thriving. I will also take a look at the current valuation of the stock to come to a buy rating at its current valuation.

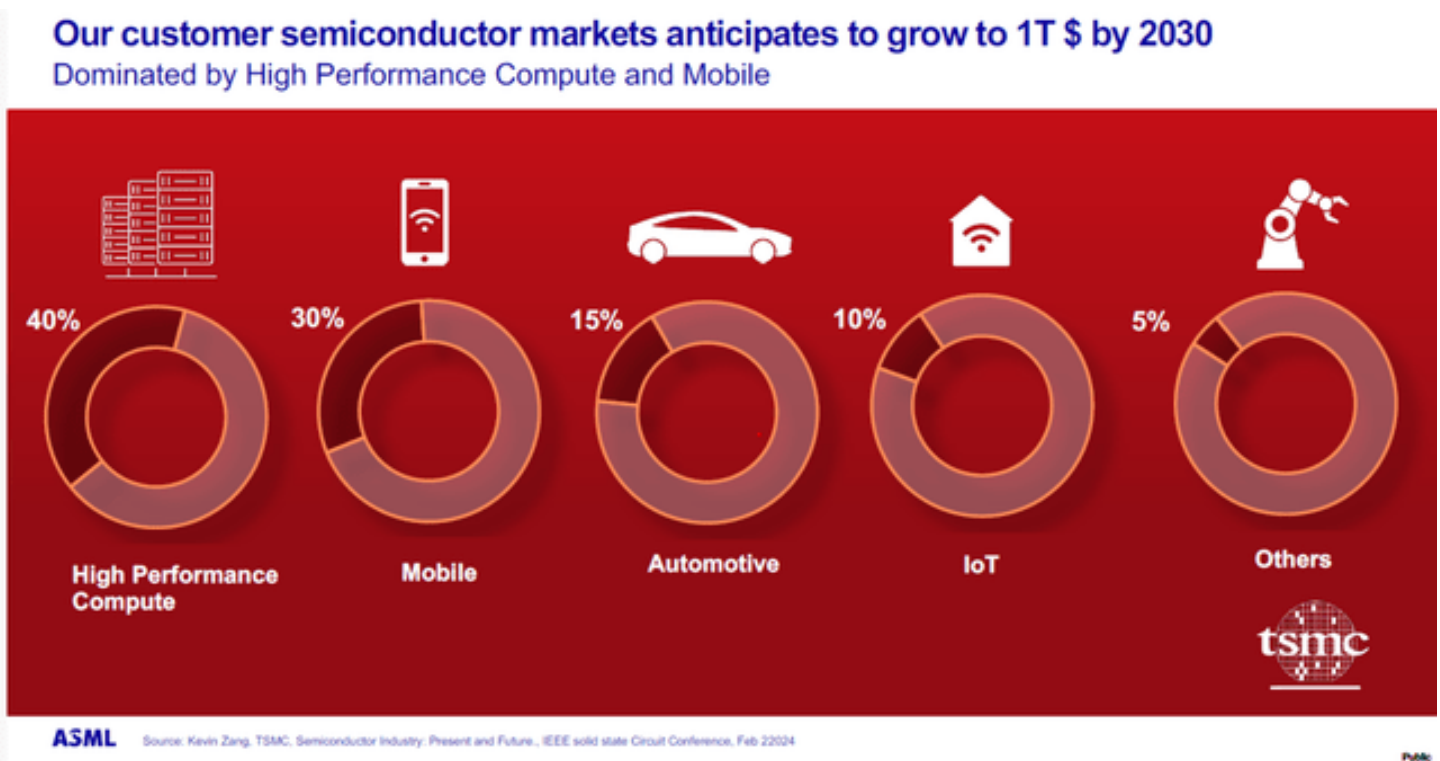
Industry Challenges

The thirst to forever improve AI and Artificial General Intelligence (AGI) drives massive compute demands, and training of new models in reasonable times requires massive data centers. Power generation and grid limits set a ceiling on training capability, meaning that a key limitation is not necessarily a technology but an energy problem.



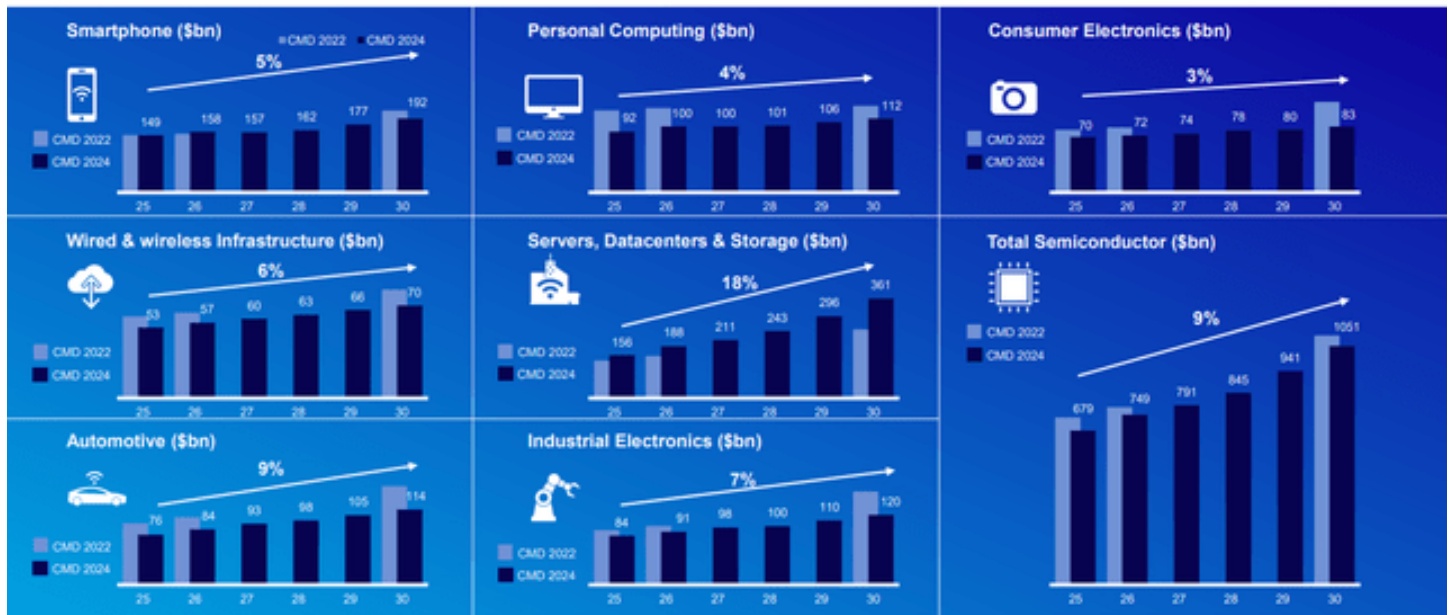
Absolute power setting AI limit (AMD, IMEC ITF 2024)

At the same time high performance compute is projected to account for 35-40% of the total market by 2030 which would be an approximate 4x increase from the 2023 levels.



Market breakdown (Martin van den Brinck ASML, TSMC)

Semi sales expected to grow at 9% CAGR (2025-2030) & surpass \$1tn by 2030 Sharp increase in growth for Servers, Datacenters & Storage offsets most of moderation elsewhere



Semi Sales – Amit Harchandani (ASML)

Combining this with chip manufactures wanting to bring AI from the cloud towards edge devices, the rise in electric vehicles and the push towards autonomous driving. The need for leading edge nodes to power these devices in an efficient way combating that energy problem is crucial. That is what High-NA EUV promises to deliver, enabling the scaling roadmaps of the industry by reducing the overall power consumptions and costs of these chips while improving their performance. The explosive growth in datacenters & high performance compute helps offset the flatter trends of the other industries forecasted by ASML themselves, but still ensure a 1T \$ semiconductor market by 2030.

High-NA EUV adoption

The adoption of High-NA EUV is picking up, with Intel (INTC) receiving the first shipment in April 2024 and another on the way. TSMC (TSM) and Samsung (OTCPK:SSNLF) are following suit in 2025 with SK Hynix (OTCPK:HXSCF) and Micron (MU) rumored to receive delivery of systems in 2025 and 2026. Together with industry-wide participation in the High-NA EUV lab at IMEC supporting the ramp for volume production. This should allow the use of High-NA EUV in high-volume production as early as 2026.

In the meantime, ASML is preparing to ramp up production to be able to produce an estimated 20 High-NA systems as of 2027/2028 lining up with the industry adoption of the technology.

There are still headwinds regarding the cost of the system itself and the promised cost reduction on chip level. Low-NA EUV will remain more cost-efficient for the foreseeable future, having better reliability, yield and throughput even if they need additional exposure steps for the same pattern compared to High-NA EUV for their currently most advanced nodes.

Low-NA EUV long-term growth & service and field option sales

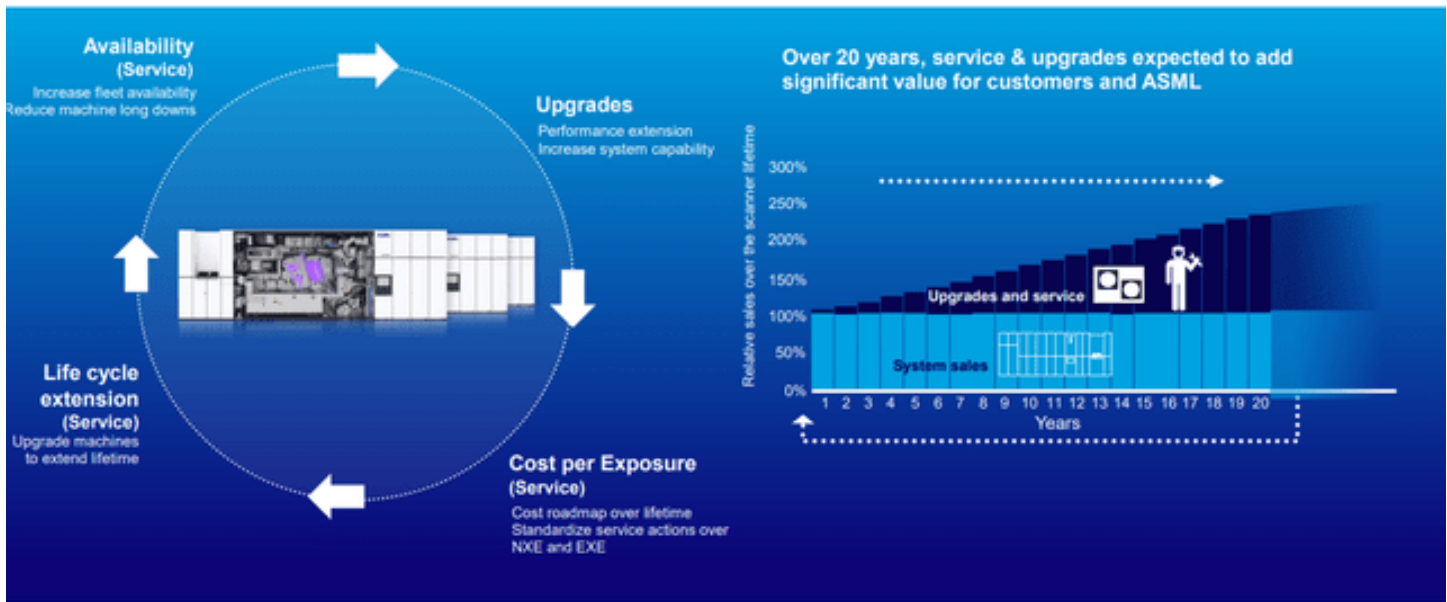
While High-NA is being rolled out, all that R&D spend and effort is not exclusive to the High-NA platform but is backported into existing Low-NA systems, allowing for more wafer per hour being processed more efficiently. They delivered the first NXE:3800E, capable of processing 220 wafers per hour in its final configuration (up from the current 160 wafers), in March 2024.

ASML is targeting fewer than 50 EUV systems total for 2025 and total net sales between 30-35B \$ revised downwards of the previous 40B \$ (which was the reason for the big dip in share price after earnings and mainly driven by fewer EUV system sales being projected). Even currently with a 'weaker' 2024 and projected 2025, the net service and field options sales increased compared to 2023 even when system sales decreased. With the ever-increasing installed base, this part of the business becomes more and more impactful. In their latest interim statutory report they showed around a 20.3% decrease in net system sales while showing a 3.9% increase in net service and field options sales for the first 6 months of 2024 compared to 2023. This means that the net service and field options sales accounted for 24.3% of total net sales for the first 6 months of 2024.

An EUV system has an expected lifetime of more than 20 years, meaning that significant value can be added to customers over that lifetime as each system can and will be upgraded and serviced, doubling the sales on top of the initial sales value. With an increased EUV installed base, the projected total sales for the installed base will be between €11-13 billion, up from the current €6.2 billion projected for 2024.

EUV Installed Base will further grow in coming years, >20 years lifetime anticipated

ASML supports customers to optimize output of their 0.33 NA EUV & 0.55 NA EUV installed base over lifetime



EUV installed base growth (ASML)

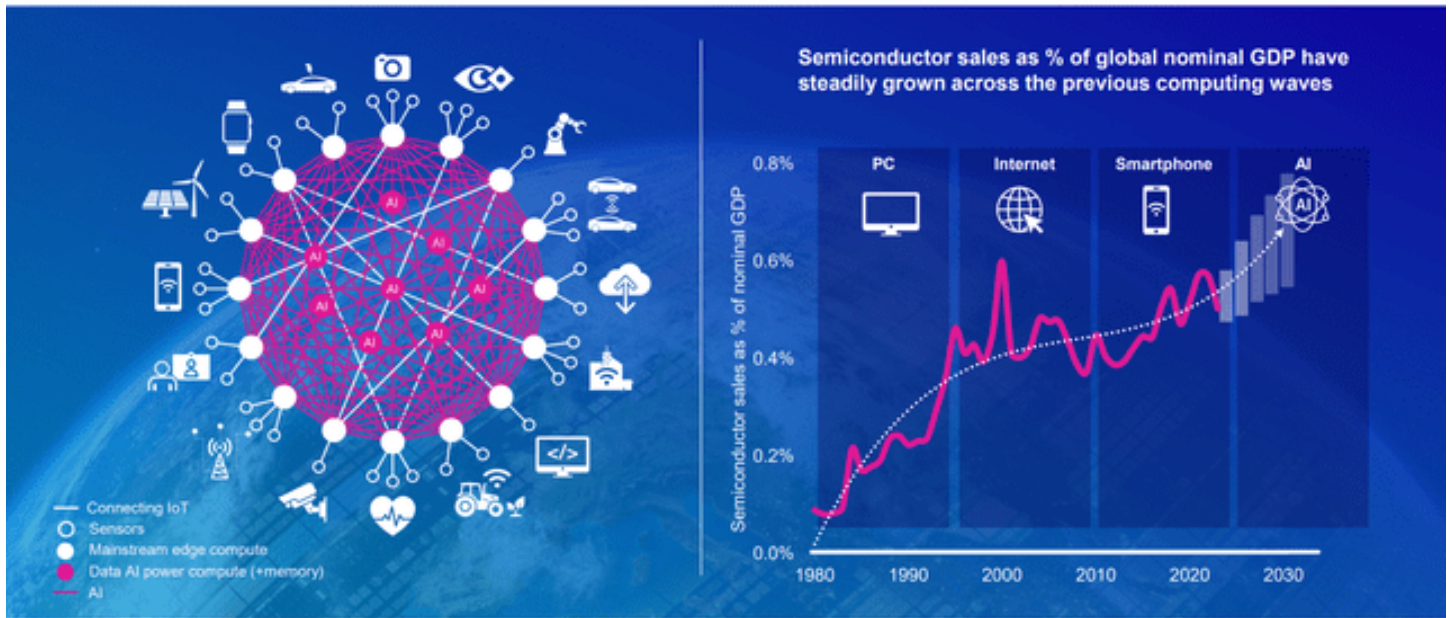
Current valuation

Looking at the current PE (TTM) ratio of around 37.4 for ASML being a little higher than the 10-year average of 34.5, I am confident they will continue to outpace the broader semiconductor market projected at a 9% CAGR till 2030 justifying this current rating taking the projected growth of the tail end of 2024 and 2025 into account the forward estimate is around 13%. Seeking Alpha projects for 2025, by using the consensus earnings estimate, a PE of 29.5. In the past 5 years, the average PE for ASML was about 44.4 with a low of 35.4 in December 2023 (and a further low of 31.5 after the October earnings call). Using this 31.5 low and the consensus EPS for 2025 of \$24.17 we arrive at a share price of about \$761 and a 6% increase to today's share price of \$713. However, looking at the 5-year average PE of 44.4, we arrive at \$1073 and a 33% increase to today's share price of \$713. This is a too optimistic outlook of course and I expect this to fall closer to the 10-year average level of 34.5 and, as such, a share price of \$833 and a 14% increase compared to today.

The forward PE for ASML is 38-39% higher than the sector overall and even 44% higher than what I would call its 'closest' peers, AMAT, LRCX and KLAC. Giving it a Seeking Alpha P/E non-GAAP (FWD) valuation grade of C- compared to B or B+ for its peers. However, this reflects the unique technology that ASML brings to the mix as in reality there are no real peers to speak of as EUV lithography is exclusive to ASML. This difference has also been practically identical across the last 5 years (with ASML's PE being about 12.5% lower than its 5-year average, while the others are between -5% and 2% of their 5-year average). This higher forward PE is also valid in my opinion due to the implementation of AI as the newest wave, ensuring strong growth in the years to come and the crucial position of (High-NA) EUV as a crucial building block in this ecosystem.

We are particularly encouraged by the rapid progress in Artificial Intelligence

We also see AI driving an increase in semiconductor sales as a % of global GDP, in the coming years



ASML

November 14, 2024

Source: ASML analysis, International Monetary Fund (IMF), SEMI

Page 11
Public

Semiconductor sales as % of global nominal GDP (ASML – Investor days 2024)

At the same time, ASML is executing on its share buyback plan and dividend payout and reiterates its statement made during their investor day about increasing their gross margins. Even though the 2025 annual revenue has been revised downwards to €30-35B, with a gross margin of 51-53% also revised downwards mainly due to less EUV system sales than expected, the long-term outlook has been reaffirmed showing the confidence that in the long run ASML and (High-NA) EUV will be indispensable in the future.

Based on different market scenarios as presented during our Investor Day in November 2022, we modeled an opportunity to reach annual revenue in 2025 between approximately €30 billion and €40 billion, with a gross margin between approximately 54% and 56% and in 2030 an annual revenue between approximately €44 billion and €60 billion, with a gross margin between approximately 56% and 60%.

Risk factors

In ASML's latest earnings call, they mention several key factors responsible for the slowdown in EUV system sales in 2025:

In Logic, the slower recovery of end markets such as mobile and PC, together with specific competitive foundry dynamics has resulted in a slower ramp of new nodes at certain customers who are as a result pushing out some of their fabs and changing their litho demand timing.

These competitive foundry dynamics are not explained more, but my guess is that it has to do with ASML customers (Intel in particular) failing to attract customers and facing major headwinds to justify building these new fabs right now as the CAPEX for these is high and the process technology to actually produce chips that can compete with for example TSMC in terms of cost and performance is complex. As such, a lot of the fabs are being pushed out one or more years (as Intel is trying to cut costs) resulting in a projected less than 50 EUV system sales for 2025. However, fabs are being pushed out

and not cancelled, with the push towards leading edge semiconductor production to be brought back to the US, Japan and even Europe by governments through a variety of CHIPS acts funding these fabs remain crucial to execute on that long-term strategy.

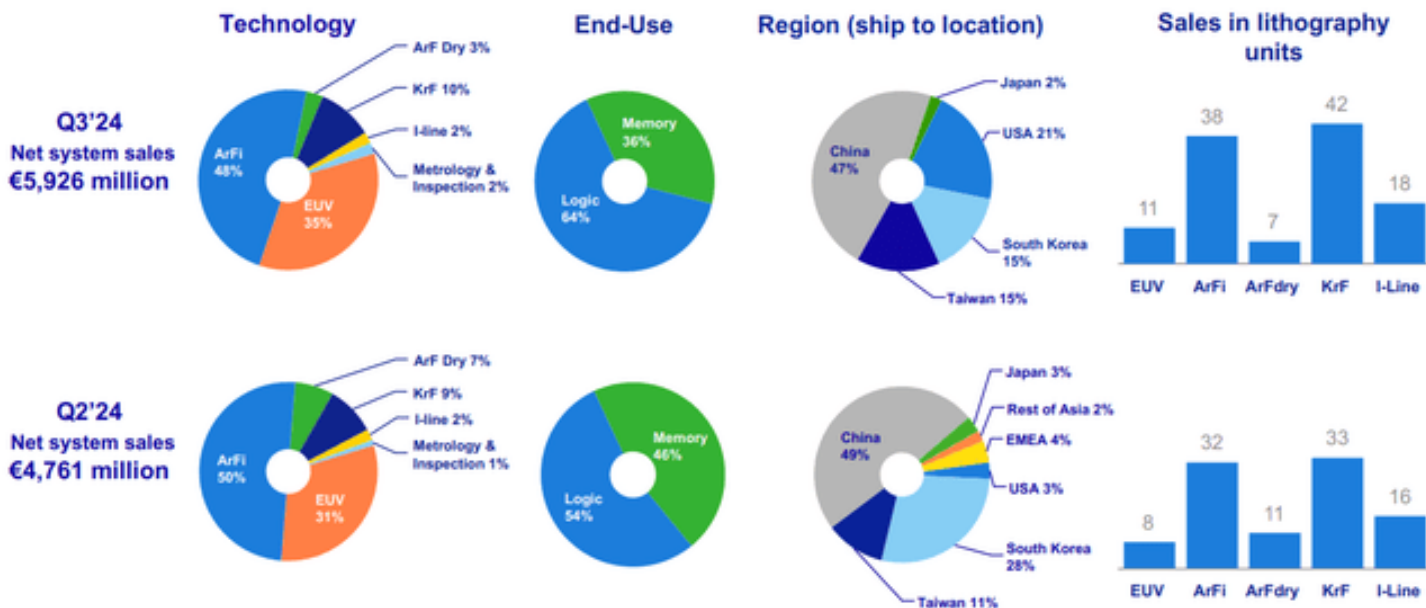
China

China was responsible for almost 50% of total revenue in Q1, Q2 and Q3 2024 buying the older generation tools (the latest DUV and all EUV tools are prohibited to being sold to China) and is projected to come back down to the historical average 20% and would be in line with the percentage of the current backlog. The reason for this huge percentage of sales towards China is explained by CFO Roger Dassen in ASML's latest earnings call:

in the past 2 years, we've been very much eating into our backlog for China, and that backlog has come to that level simply because in the years before that, we had a fairly low auto fill rate for China. So as a result of that backlog build-up in the past because of the global market circumstances, we were able to deliver on that backlog. So that's why the China sales in 2023 and 2024 have been so high. So as a result, we indicated before that we expect at a certain point in time for that to normalize, and that is, I think, what you now see in the numbers

This backlog still is around €36 billion and is more than the entire 2025 net sales outlook and stands as a testament of the companies market dominance.

Net system sales breakdown (Quarterly)



Net system sales per region (ASML)

Looking further at the bigger picture, EUV only accounts for 35% of net system sales and will only become more and more important in the future, even though the 2025 outlook has been revised downwards, EUV system sales will still grow in 2025 compared to 2024. ASML is continuing to build capacity to respond to the expected demand increase and at the same time is working on bringing internal costs down for its High-NA EUV tool, which will positively impact the gross margin in the long run.

Conclusion

ASML remains the sole EUV lithography player and even with recent headwinds and revised forecast for 2025, the long-term outlook remains positive and unchanged since 2022. With the massive AI and high performance compute opportunity and the demands that AI will place on the further transistor scaling roadmap (High-NA) EUV will be crucial in years to come.

TSMC: A Strong AI Stock For 2025

Jan 20, 2025 The Asian Investor

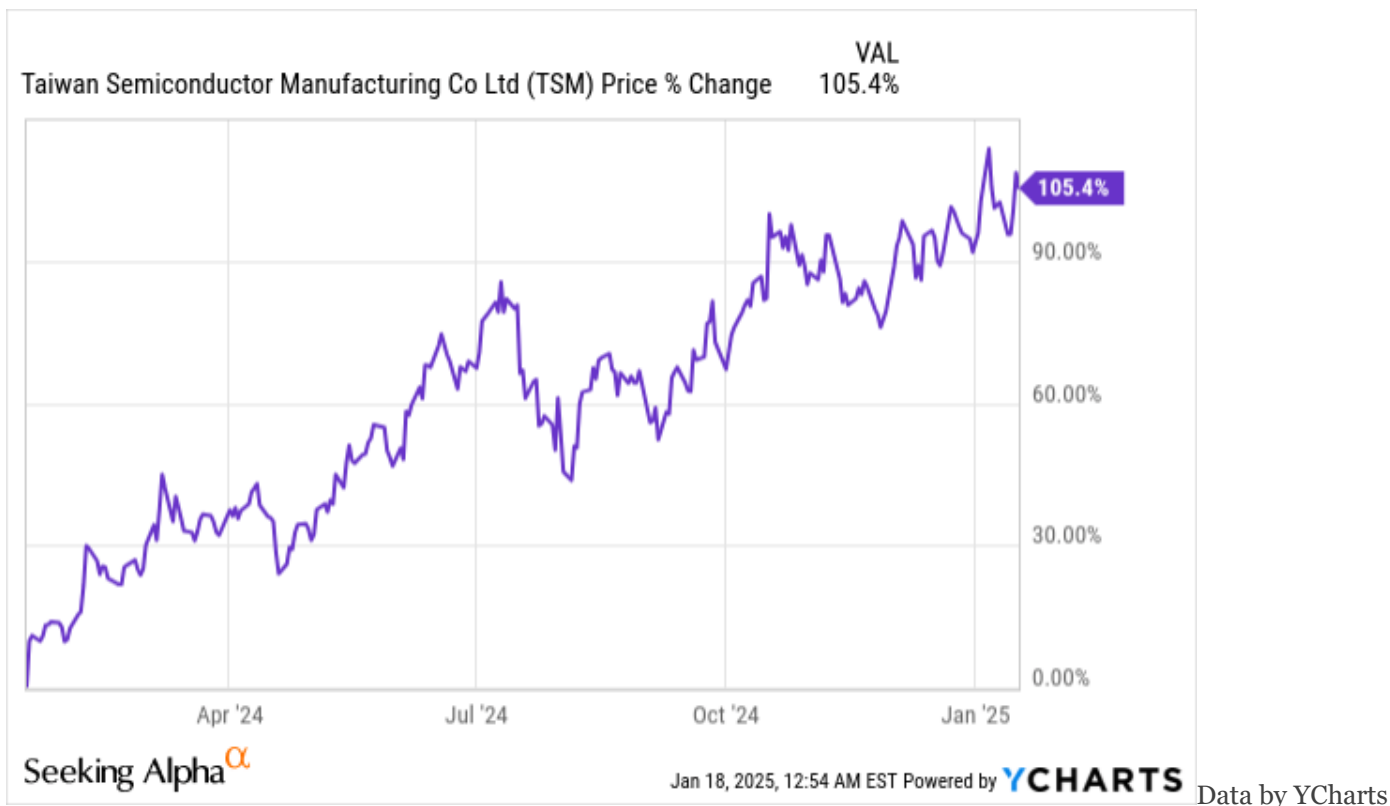
Summary

- Taiwan Semiconductor Manufacturing reported strong Q4 earnings, driven by surging demand for AI-optimized chips, signaling robust AI spending into 2025.
- TSMC's revenue growth in high-performance computing was 58% in FY 2024, outpacing smartphone-related growth and boosting gross margins to 59% in Q4.
- Despite market dominance and a 64% global foundry share, TSMC's shares appear to be undervalued relative to other high-performing AI hardware stocks.
- Risks include potential geopolitical tensions between Taiwan and China, but TSMC's market position and AI growth prospects make it a compelling buy.



SweetBunFactory

Taiwan Semiconductor Manufacturing (NYSE:TSM) reported better than expected earnings for its fourth fiscal quarter last week, which sent a strong signal to investors that the AI boom seems to have considerable staying power in 2025. Taiwan Semiconductor Manufacturing's revenues soared in the fourth quarter, and accelerated in December, indicating that concerns about a slowdown in AI spending are unwarranted. As one of the largest chipmakers in the world, Taiwan Semiconductor Manufacturing is in a unique position to capitalize on surging demand for AI-optimized chips, especially as it comes from the hyperscale market. I believe the risk profile is still very much skewed to the upside here, and I see considerable revaluation potential for TSMC in 2025.



TSMC beats earnings

Taiwan Semiconductor Manufacturing reported better than expected financial results for its fourth fiscal quarter due to an unprecedented spending boom related to AI-capable chips: in the fourth-quarter, TSMC reported adjusted earnings of \$2.24 per-share which topped analysts' consensus estimates by \$0.02 per-share. Revenues came in at \$26.4B which also were \$385M better than expected.

Latest Quarter's Earnings

Announce Date	1/14/2025
EPS Normalized Actual	\$2.24 (Beat by \$0.02)
EPS GAAP Actual	\$2.24 (Beat by \$0.01)
Revenue Actual	\$26.37B
Revenue Surprise	Beat by \$384.96M

Seeking Alpha

Taiwan Semiconductor Manufacturing continued to benefit handsomely from an accelerating AI spending boom which led to record revenues for the chip foundry in the fourth fiscal quarter as well as an improving gross margin profile. In the fourth fiscal quarter, TSMC generated \$26.88B in total net revenue, showing a solid 37% year-over-year growth rate. In December, TSMC's top-line growth accelerated to 58% year-over-year. The semiconductor company also came very close to the top end of its guidance range of \$26.1-26.9B.

Further, with strong demand for AI chips boosting the foundry's growth, TSMC was able to boost its gross margins as well. TSMC's gross margin surged to 59% in Q4'24 -- showing 6 PP growth year-over-year -- which was one of the highest levels the global chip foundry has ever seen in its business.

Selected Items from Statements of Comprehensive Income

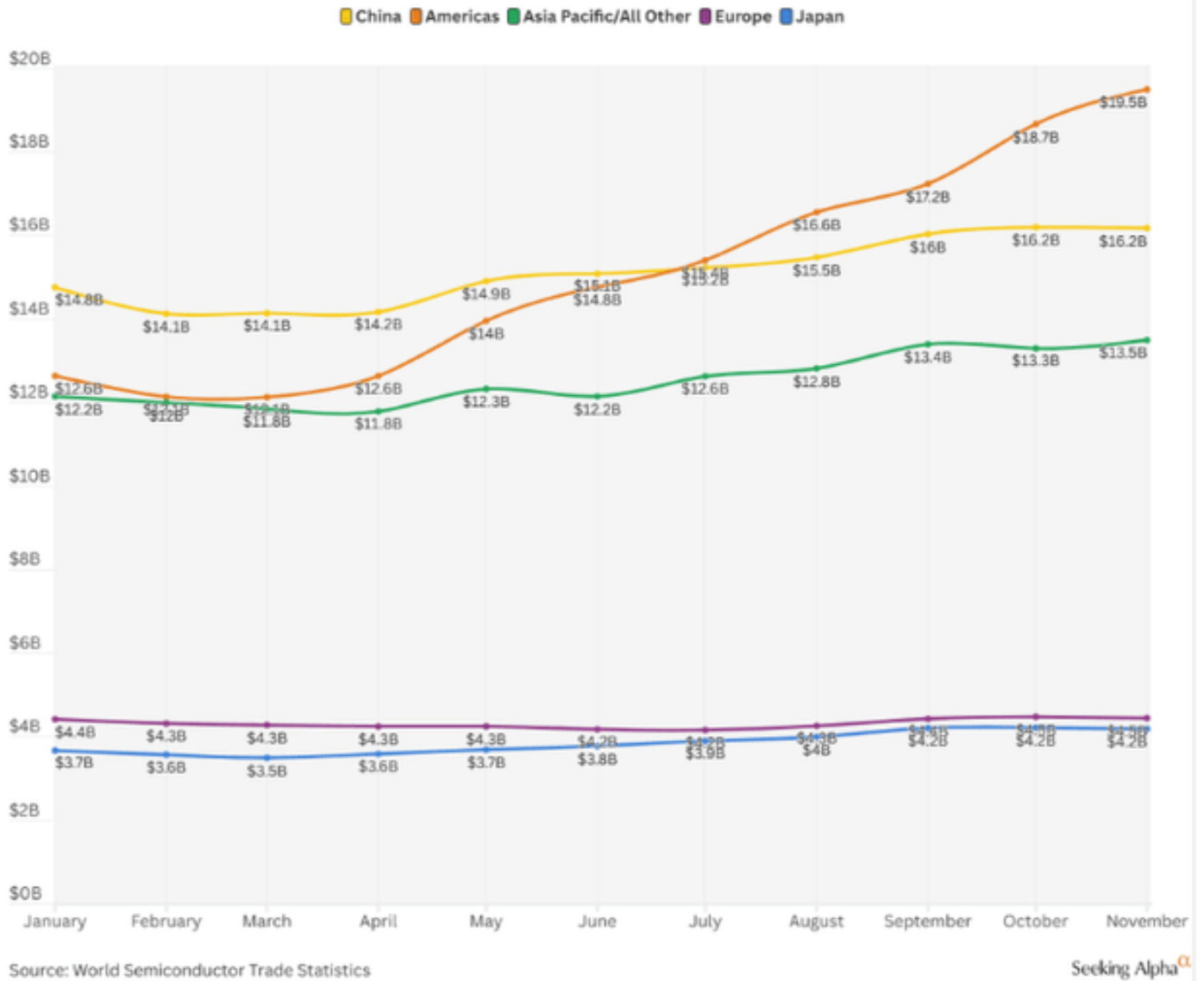
(In NT\$ billions unless otherwise noted)

	4Q24	4Q24 Guidance	3Q24	4Q23	4Q24 Over 3Q24	4Q24 Over 4Q23
Net Revenue (US\$ billions)	26.88	26.1-26.9	23.50	19.62	+14.4%	+37.0%
Net Revenue	868.46		759.69	625.53	+14.3%	+38.8%
Gross Margin	59.0%	57.0%-59.0%	57.8%	53.0%	+1.2 ppts	+6.0 ppts
Operating Expenses	(86.34)		(79.08)	(71.62)	+9.2%	+20.6%
Operating Margin	49.0%	46.5%-48.5%	47.5%	41.6%	+1.5 ppts	+7.4 ppts
Non-Operating Items	23.09		23.42	18.07	-1.4%	+27.7%
Net Income Attributable to Shareholders of the Parent Company	374.68		325.26	238.71	+15.2%	+57.0%
Net Profit Margin	43.1%		42.8%	38.2%	+0.3 ppt	+4.9 ppts
EPS (NT Dollar)	14.45		12.54	9.21	+15.2%	+57.0%
ROE	36.2%		33.4%	28.1%	+2.8 ppts	+8.1 ppts
Shipment (Kpcs, 12"-equiv. Wafer)	3,418		3,338	2,957	+2.4%	+15.6%
Average Exchange Rate--USD/NTD	32.30	32.0	32.32	31.88	-0.1%	+1.3%

tsmc

A key driver for TSMC's impressive top-line growth as well as gross margin expansion, is, as I indicated, surging demand for the company's AI chips which are needed in all kinds of applications, ranging from cars to consumer electronics. Global semiconductor sales reached \$57.8B in November 2024, a monthly record, due to companies around the world scrambling to secure chip supplies. Growth is especially pronounced, according to the World Semiconductor Trade Statistics (via Seeking Alpha) in the Americas, led by the U.S.

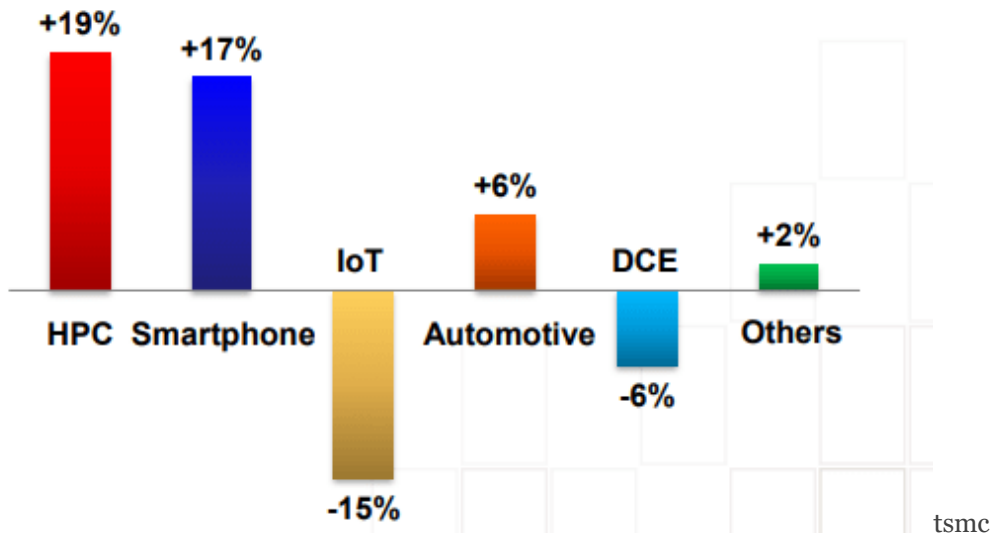
Trajectory of semiconductor sales across geographies



Seeking Alpha

The high-performance computing sector, which includes hyperscalers in the Data Center industry, is the single biggest driver of TSMC's revenue growth. In the fourth-quarter, the high-performance computing market generated the fastest growth for TSMC, with a growth rate of 19% Q/Q which even beat the typically very strong smartphone platform. On a full-year basis, TSMC's growth related to hyperscalers was even more impressive: in FY 2024, total revenue growth related to high-performance computing was 58% Y/Y... which was 2.5X faster than smartphone-related top-line growth (+23% Y/Y).

Growth Rate by Platform (QoQ)



TSMC's valuation

Taiwan Semiconductor Manufacturing, as a leading global foundry with a market share of 64% (as of Q3'24), according to Counterpoint Research, is the ultimate beneficiary of accelerating AI spending and growing adoption of AI-optimized chips... and the valuation is decoupled from the firm's strong fundamentals, in my opinion.

Global Foundry Market Share (%)							
Foundry Company	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024
TSMC	61%	58%	59%	61%	62%	62%	64%
Samsung Foundry*	11%	12%	13%	14%	13%	13%	12%
UMC	6%	7%	6%	6%	6%	5%	5%
SMIC	5%	6%	6%	5%	6%	6%	6%
GlobalFoundries	7%	7%	6%	6%	5%	5%	5%
Others	10%	11%	10%	9%	9%	9%	8%

Counterpoint Research

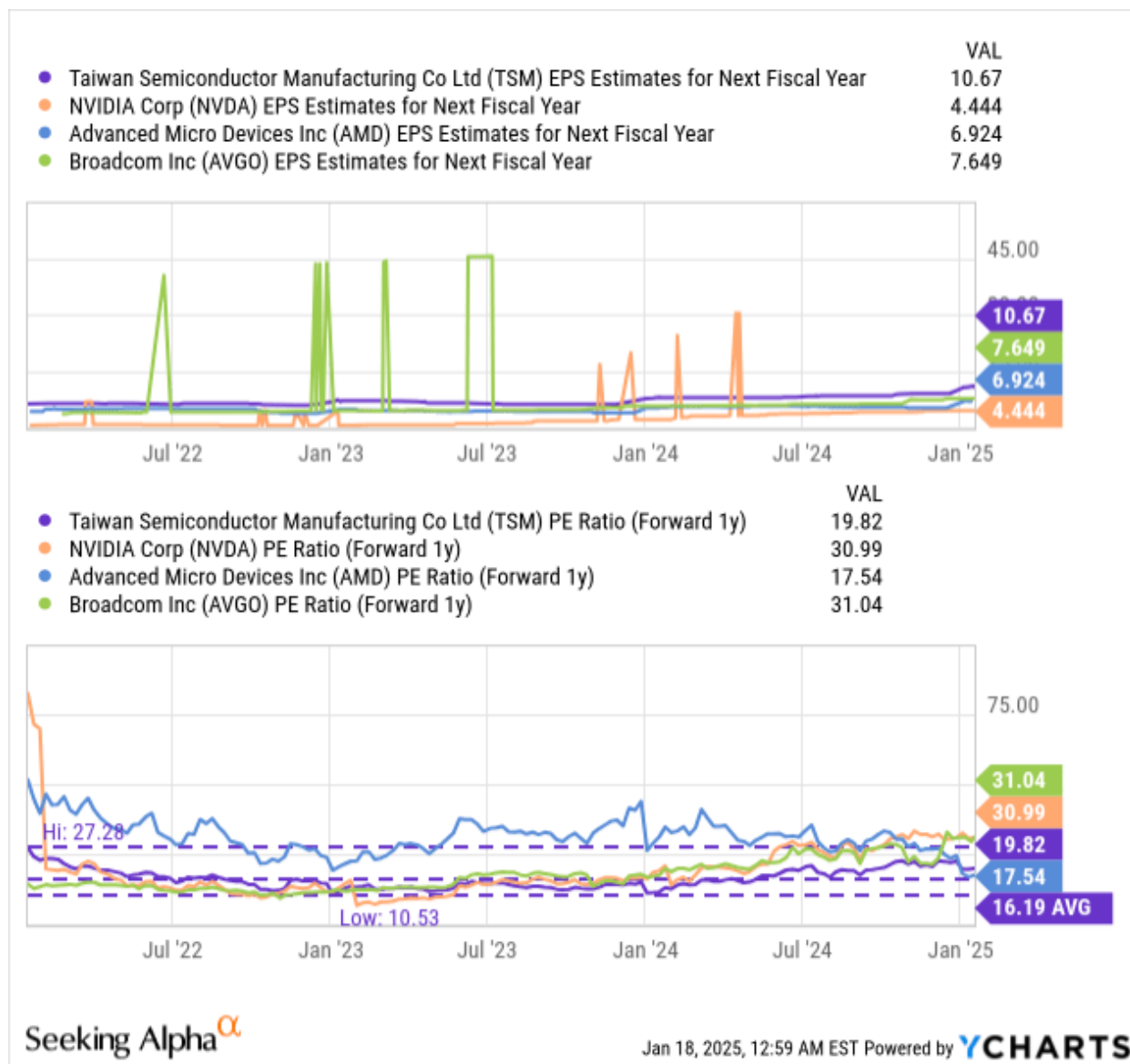
Shares of Taiwan Semiconductor Manufacturing are currently valued at a forward price-to-earnings ratio of 20X which makes TSMC, despite its market dominance, one of the more affordable hardware stocks operating in the promising AI market.

The strongest AI stock, in my opinion, is Nvidia (NVDA) due to its launch of its next-gen Blackwell GPU -- which has massive potential to crush estimates this year. Nvidia is currently priced at a forward P/E ratio of 31X but is deserving of the highest earnings multiplier given its leading position in the AI GPU market. While Nvidia has already had a very good run in the last years, I believe the company's growth potential, even at a 31X P/E ratio, is fundamentally underestimated which I explained here: [Why 2025 Could Be A Breakout Year For Nvidia](#).

Broadcom (AVGO) is another AI hardware stock that is seeing booming revenues, and the firm's shares trade for an earnings multiplier of 31X as well. I like Broadcom chiefly because of its revenue momentum as well as its partnership with Apple (AAPL) to develop custom AI chips.

AMD (AMD) has suffered lately, without reason in my opinion, causing the P/E ratio (for FY 2026) to drop to just 17.5X. I believe AMD's valuation makes no sense here and shares have considerable rebound potential as the company's fundamentals are looking better than last year (Data Center growth, margins, free cash flows).

In my last work on TSMC I calculated a fair value, based off of an industry average P/E ratio of 29X, of \$250 per-share which I still believe is a very realistic price target for 2025. Currently, shares trade at \$212, implying at least 18% upside revaluation potential.



Risks with TSMC

There are a number of risks with chip manufacturing companies, the most important one being a potential invasion of Taiwan by China. A potential conflict between these two countries would likely fundamentally disrupt international semiconductor supply chains and hurt TSMC's growth prospects, especially in the U.S. What would change my mind about TSMC is if the global chip foundry were to see a decline in AI chip production, lower gross margins or a drop-off in free cash flows.

Applied Materials Will Be A Semiconductor Leader In 2025

Jan 22, 2025 Jishan Sidhu

Summary

- AMAT is a leader in semiconductor technology, positioned to capitalize on AI and energy megatrends, with a strong financial performance and undervaluation.
- Despite underperforming the broader market, AMAT's low P/E ratios and strong profit margins highlight significant growth potential and a compelling investment opportunity.
- The EPIC Platform and energy-efficient products bolster AMAT's edge in data centers and AI, addressing the increasing energy demands of advanced AI models.
- Analysts' conservative price targets underestimate AMAT's potential, driven by AI and renewable energy sectors, making it a strong buy despite macroeconomic risks.



Monty Rakusen

Applied Materials, Inc. (NASDAQ:AMAT) is a Santa Clara, California-based multinational supplier of equipment, services, and software for the manufacture of semiconductor chips for electronics, displays, smartphones, solar panels, and data centers. AMAT is the second-largest supplier of global semiconductor equipment behind ASML Holding N.V. (ASML).

FISCAL YEAR 2024

Record Performance

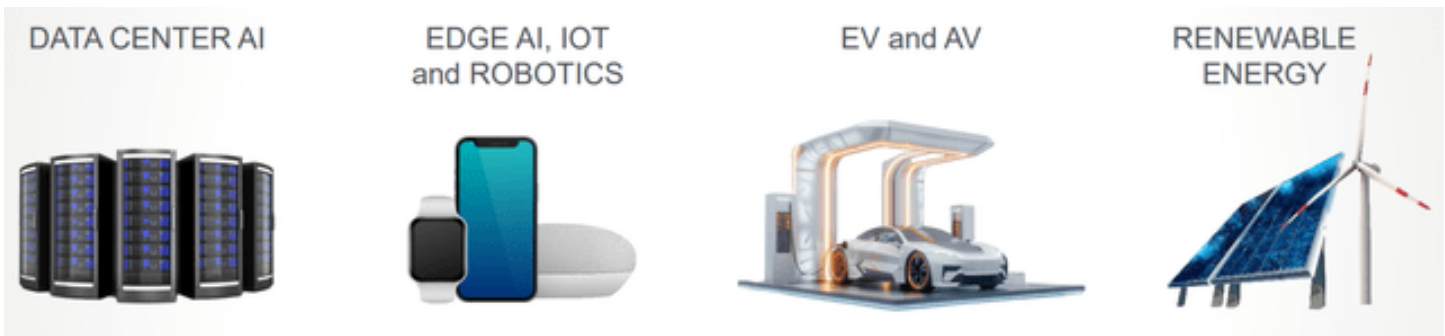


AMAT Q4'24 Investor Presentation

Through these operations, AMAT has recorded FY24 revenues of \$27.18 billion - a 2.73% YoY increase, alongside an EBITDA of \$8.26 billion - a 1.99% increase- and a free cash flow of \$7.49 billion - a 1.41% decline driven by decreased investing cash flows.

Introduction

AMAT has positioned itself as a leader in developing materials and architectures not just for the eminent technologies of today - inclusive of smartphones, smart homes, displays, and other electronics - but also for rapidly growing sectors, such as data centers, EVs, IoT, robotics, and renewables, with AMAT being the clear leader in solar semiconductor technology. At the core of the investment thesis for AMAT is its ability to capture value through the artificial intelligence megatrend, which, I believe, has been underpriced by the market.

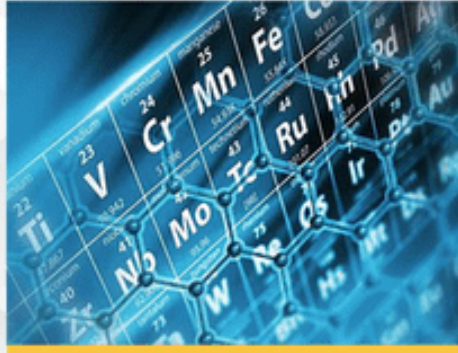


AMAT Q4'24 Investor Presentation

AMAT not only provides materials and software oriented towards data centers and AI, but aims to support industry fundamentals by constructing energy-efficient products, which are becoming all the more significant as LLMs and other AI products become increasingly complex and, therefore, energy intensive.



AI driving need for energy-efficient computing



Device architecture inflections increasingly enabled by materials engineering



Complex industry roadmap creating incremental growth opportunities

AMAT Q4'24 Investor Presentation

Therefore, driven by the company's positioning across multi-sector super cycles, alongside a substantive undervaluation, I rate AMAT a 'strong buy'.

Valuation & Financials

Comparable Companies

The semiconductor materials industry is highly concentrated due to the high labor/talent barriers to entry, required sales infrastructure, and underlying IP required. Additionally, the high degree of specialization needed for specific end markets reduces competitive intensity and heightens the moat for incumbents. The group of large semiconductor materials companies with similar operations to AMAT includes - as listed on the company's ticker page on Seeking Alpha - Fremont, California-based wafer fabrication equipment supplier, Lam Research Corporation (LRCX), Milpitas, California-based process control and yield management systems company KLA Corporation (KLAC), automatic test equipment maker Teradyne, Inc. (TER), and photolithography supplier, Entegris, Inc. (ENTG).

Symbol	AMAT	LRCX	KLAC	TER	ENTG
Company	Applied Materials	Lam Research Corp	K.L.A-Tencor Corp	Teradyne Inc	Entegris Inc
Price Information					
Performance					
12-Month					
%Chg	+14.84% since 01/19/24	-1.37% since 01/19/24	+25.16% since 01/19/24	+21.69% since 01/19/24	-11.31% since 01/19/24
Low	158.96 on 12/20/24	68.87 on 11/20/24	581.70 on 01/31/24	92.29 on 01/31/24	94.92 on 11/04/24
High	255.89 on 07/10/24	113.00 on 07/11/24	896.32 on 07/11/24	163.21 on 07/16/24	147.57 on 07/12/24
Growth					
5-Year Return	203.88%	160.14%	323.62%	93.43%	85.01%
Five-Year Revenue Growth	86.04%	54.40%	114.76%	27.39%	127.28%
5-Year Earnings Growth	184.54%	104.79%	180.61%	23.63%	39.68%
Ratios					
Price/Earnings ttm	21.53	24.72	29.48	44.96	37.33
Price/Earnings Forward	20.49	22.91	24.94	33.64	29.03
Price/Earnings to Growth	1.96	1.48	1.63	2.30	1.43
Return-on-Equity %	39.25%	50.60%	105.16%	18.56%	12.24%
Return-on-Assets %	21.92%	22.34%	22.77%	13.91%	5.02%
Profit Margin %	26.41%	25.68%	28.15%	16.77%	5.13%
Debt/Equity	0.33	0.59	1.86	0.00	1.15
Price/Sales	5.58	6.84	10.19	8.24	5.04
Price/Cash Flow	20.83	24.09	25.99	35.86	17.32
Price/Book	8.33	12.20	28.46	7.77	4.47
Book Value/Share	23.05	6.58	26.61	17.82	23.79

barchart.com

As demonstrated above, AMAT has experienced middling peer group performance - up 14.84% - with substantial outperformance relative to the likes of Lam Research and Entegris. Despite this, I believe AMAT is positioned for outperformance, with the company's underperformance well-demonstrated by multiples-based undervaluation as well as superior growth capabilities.

For instance, AMAT maintains the lowest TTM P/E multiple of the peer group and the lowest forward P/E ratio. This multiple-based discount is echoed in the company's P/S multiple - which is the second-lowest of the peer group - and second-best-in-class P/CF multiple.

Moreover, AMAT offers the second-highest profit margin and third-highest ROE of the peer group; coupled with the second-lowest debt/equity level at 0.33x, and so AMAT offers a strong capital growth opportunity.

Valuation

According to my discounted cash flow valuation, at its base case, the net present value of AMAT should be \$241.61, representing a ~28.39% spread.

Assumptions		Intrinsic Value (DCF) vs Market Value	
WACC	9.00%	Intrinsic Value	201,500,000,000.00
5Y FWD CAGR	10.00%	Market Value	156,940,000,000.00
5Y Margin Growth	3.00%	% Difference	28.39%
Perpetual Growth	2.50%	# Shares Outstanding	834,000,000.00
		Price/Share	\$ 241.61

Proprietary DCF

My model, calculated over 5 years with a 2.50% perpetual growth rate built-in - reflecting my belief in the growth of AMAT's target market through multiple megatrends - assumes a discount rate of 9.00% - balancing the company's lower debt with high beta - while projecting a 10.00% forward 5Y sales CAGR - in line with trailing levels of 9.58%, justified by

data center and IoT demand. Moreover, I baked in 3.00% margin growth in line with trailing operating leverage growth, driving margin growth.

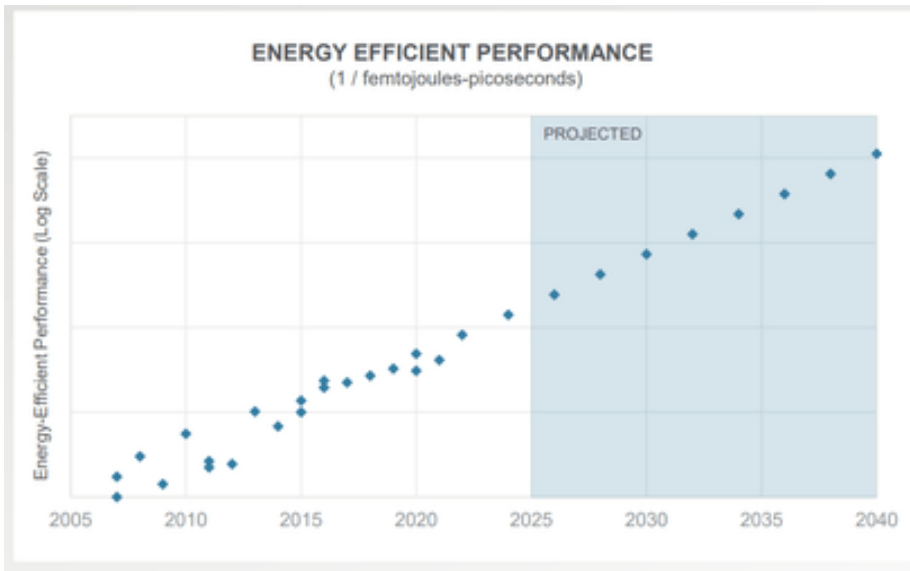
Applied Materials is Positioned to Benefit From AI, Energy Megatrends

As previously discussed, a core aspect of AMAT's growth story remains its ability to capture megatrend-based growth, whether it be data center products or renewables, in which AMAT is the leader. AMAT aims to drive this growth through the maintenance of a transferable and connected portfolio of materials and software products, the development of its EPIC Platform - online in 2026 - and the development of B2B Advanced Services products. The EPIC Platform in particular may drive an edge for AMAT in data centers as it represents a collaborative innovation platform to accelerate the adoption, and thus commercialization of its semiconductor products in the advanced packaging R&D space. In layman's terms, advanced packaging strives to decrease complexity, increase processing bandwidth, and support more rapid solution paths for AI.

<p>Co-optimized Solutions</p> <p>Integrated Materials Solutions (IMS™)</p>		
CONNECTED PORTFOLIO	DEEPER COLLABORATION	ADVANCED SERVICES
<ul style="list-style-type: none">» Broad, unique and connected portfolio of highly enabling technologies» Integrated solutions account for ~30% of semiconductor systems revenues	<ul style="list-style-type: none">» Global EPIC Platform can accelerate learning, increase success rates, and improve efficiencies» EPIC Center in Silicon Valley is under construction and on track to come online in 2026	<ul style="list-style-type: none">» AGS delivered record quarterly and annual revenue; 21st consecutive quarter of YoY revenue growth» Signed first five-year service agreements with multiple customers in FY24

AMAT Q4,24 Investor Presentation

As such, while AMAT is driving proactive value through EPIC for hyperscalers and other AI innovators, the true strength of AMAT in the space remains its ability to support power efficiency. A basic LLM query already requires 10x more power than a search on any given search engine; as LLMs become increasingly complex, this hunger for energy will increase exponentially. With the advent of agentic AI as a key theme for 2025, energy is emerging not only as a major cost for hyperscalers but also as a tangible constraint to developing new models and beating competitors. As such, improvement in performance/watt is central to AMAT's value proposition, since the company already leads such measures in consumer electronics.



- AI companies increasingly focused on reducing power-per-operation
- Goal is to drive 10,000X improvement in performance-per-watt over next 15 years

AMAAT Q4,24 Investor Presentation

Wall Street Consensus

Analysts are generally less bullish than my attitude on the company, projecting an average 1Y price target of \$211.74, a 9.78% increase.



TrendingView

This mirrors both the volatility of the company, which may inhibit analyst optimism, as well as my belief that Wall Street is undervaluing the accretive impact of AI on the company.

Risks & Challenges

Government Involvement in Chips, AI Creates Room for Disruption, Regulation

As announced on Tuesday, the newly inaugurated Trump administration has already committed to supporting a highly AI-friendly business environment, presiding over a joint announcement by OpenAI, Oracle Corporation (ORCL), and

Softbank committing \$500 billion to the industry. However, this level of liquidity of the space introduces the potential for the financing of novel disruptors and the potential for the government to choose the 'winners' of the AI era.

Underlying Demand Driven By Macro Fundamentals, AI Impact

My thesis for the outperformance of AMAT largely boils down to the company's ability to leverage its EPIC and energy-efficiency capabilities to support AI. Yet, if AI does not bring about the projected productivity increases for companies and other organizations, or if other macro factors - such as a return to a tighter monetary environment - take hold, then the derived demand for AMAT's products may come under threat, driving a downwards re-rating of the company on my end or just reducing upside for the market.

Samsung: Now In Deep Value Territory

Jan 13, 2025 Perseus Perspectives

Summary

- Samsung Electronics faced significant challenges in 2024, including poor execution in the HBM market, increased DRAM competition, and political turmoil in Korea.
- Despite these issues, Samsung's valuation has reached deep value territory, presenting a buying opportunity for a high-quality business with \$66 billion in net cash.
- Management's rare apology and Jensen Huang's support indicate potential for recovery, especially if Samsung secures HBM supply to Nvidia.
- The main risks include continued HBM struggles and Chinese competition in the DRAM market, but the long-term outlook remains optimistic.



Javi_indy/iStock Editorial via Getty Images

Samsung Electronics overview

Samsung Electronics (OTCPK:SSNLF) was frankly a great disappointment for investors in 2024. Around mid-year I wrote a buy thesis on the stock with the rationale that the stock had significantly underperformed its closest memory market

peers SK Hynix (OTCPK:HXSCF) and Micron (NASDAQ:MU), a dynamic I expected Samsung to rectify through improved execution of their high-bandwidth memory or HBM product which had fallen behind peers, in particular Hynix.

Despite my optimism at the time Samsung continued to fail to pass benchmark tests to supply HBM to Nvidia (NASDAQ:NVDA), the key market customer for the product at this time. Additionally the firm which has the market leading share of traditional commodity DRAM memory has faced increased competition from the Chinese player CXMT. The newfound competition in traditional DRAM has compounded the existing struggle in HBM, as Samsung hasn't benefited from the associated product differentiation experienced by Hynix.

Finally, the stock has been impacted by political drama in Korea, a risk for which there was not mitigation. Despite this landslide of negativity I am reiterating a buy recommendation on the name as the valuation level is now in deep value territory for a high quality business undergoing a difficult run.

I believe the stock has hit the bottom both in terms of price and sentiment, even a modest improvement in their fortunes should precipitate a rebound. Management have been forthcoming about the issues faced by the stock and their most important external partner Jensen Huang gave a much needed vote of confidence to the company at the recent Consumer Electronics Show.

What went wrong

So lets dig into why the stock has performed so badly over the last number of months. The first thing to acknowledge is the firm has not executed anywhere near the standard that investors and the general public have come to expect. The scale of underperformance has been so dramatic that in October, Samsung took the highly unusual step of issuing a public apology along with its Q3 earnings result. It is a rare feat to hear corporate management candidly admit to shortcomings but I think it highlighted to investors that the company are serious about facing up to existing challenges and proactively addressing them.

Central to the poor execution story is the firm's struggle in the HBM market. At the tail-end of last year it was hoped that Samsung would get a positive certification to supply HBM to Nvidia's leading GPUs such as Blackwell. However issues relating to power efficiency hampered the process. I expect investors will remain sceptical of the firm's internal execution until they get the nod from Nvidia for use in leading edge GPUs. Samsung historically traded in-line or at a premium to SK Hynix, due to missing out on supplying HBM for GPUs Samsung now trades at a 50% valuation discount, this is a staggering divergence for two firms who typically trade in unison.

While the firm has struggled to make headway into the upper echelon of the HBM market, it has faced increasing competition in the traditional DRAM market. Traditional memory in the form of both DRAM and NAND are known as commodity memory. The reason for this is that much like a commodity like coal for instance, there is no product differentiation between the respective sellers. Admittedly memory homogeneity isn't as extreme as a pure commodity but market participants are price takers simply based on supply and demand, rather than price setters based on differentiated selling points of their products.

The memory market has been dominated by Samsung, Sk Hynix and Micron over the recent past, but the dynamic is being disrupted as Chinese commodity memory maker CMXT has been actively stealing market share and driving down the market price by bringing more supply online. According to recent reports the Chinese firm is moving into production of DDR5 DRAM. The entry of Chinese competition into the lower end of the memory market is not earth shattering but it has presented a tricky headwind for Samsung at a time when its HBM efforts are coming up short.

Another unforeseen headwind that hasn't helped sentiment in recent months has been the debacle that is Korean politics at the moment. On December 3rd the sitting president Yoon Suk Yeol tried to impose martial law on the country. This has led to the removal of Yoon as president and the impeachment of his successor. The situation is still very much a live issue with the FT reporting this week that Yoon is refusing to cooperate with authorities and has barricaded himself in a compound protected by his personal security unit.

I am no expert on politics, least of all Korean politics. However, I do know that Korea has been a stable democracy since the Korean war in the 1950s, hence my base case is that the situation will be peacefully resolved either internally or through external pressure from the United States who surely will not allow one of their closest allies in the region to fall apart. For now at least, the political situation remains yet another headwind weighing on Samsung sentiment.

Causes for optimism

Given the slew of negative headlines that have come out of the company and the current level shares are trading at in the market I think its clear we have hit absolute rock bottom sentiment for the stock. We all know the old Buffett quote about being greedy when other are fearful, now feels like a textbook example of that. When sentiment swings so far in one direct the likelihood of reversion becomes greater and greater.

Another reason for investors to be optimistic about Samsung is the sheer strength of the company balance sheet. The firm has a whopping \$66 billion of net cash on the balance sheet, this equates to nearly 25% of the current company market cap. Management have traditionally taken a very long term conservative approach regarding balance sheet management, which I think is prudent. With shares trading at book value in the market, it is highly possible we might see a slight loosening of the purse strings to engage in opportunistic buybacks to deliver value for shareholders.

Risks

The main risk to my buy recommendation in the near term is a continued failure of Samsung to break into the leading edge with their HBM product. I think it is unlikely the stock is going to see a major reversal in sentiment until investors are convinced the ship has been righted. The provision of HBM to Nvidia in particular looks as though it is the key barometer on which investors will judge progress. Jensen Huang seems convinced its only a matter of time before Samsung get their mojo back but given their recent form its reasonable for investors to express doubts.

The second big risk is the continued penetration of Chinese makers in the commodity memory market. Samsung is the world's largest commodity DRAM maker so new supply hitting the market logically leads to one of two things. Either new supply is absorbed by the market in which case prices will naturally fall as supply outstrips demand. On the other hand Samsung, Hynix and Micron may be forced to reduce their supply to the market in order to maintain price levels. In either outcome it is a net-negative to incumbent memory makers.

Marvell Technology: A High-Growth AI Powerhouse Heading Into 2025

Jan 20, 2025 Gil Roststein

Summary

- Marvell Technology stands out as a leader in the transition to custom silicon AI, offering efficient and cost-effective solutions.
- With data center products comprising 73% of Q3 revenue and a 98% YoY growth in this segment, Marvell's focus on AI and can benefit from it significantly.
- While trading at a premium valuation (P/E of 80x), Marvell's strong growth prospects and narrowing valuation gap compared to peers suggest significant upside potential.
- A groundbreaking multi-year deal with Amazon highlights Marvell's innovation and leadership in AI-driven data center infrastructure.
- Despite the reliance on the cyclical semiconductor industry and China exposure, Marvell's diversified portfolio and strategic shift to AI-driven revenue mitigate risks and underscore its growth trajectory.



da-kuk

I hear many of my friends struggle to analyze companies like Marvell Technology (NASDAQ:MRVL), a company with a wide range of products. In this article, I will try to analyze the company in a simple way and explain why I believe it is a top pick for 2025, despite its high valuation. Data center artificial intelligence demand is likely to rise dramatically, and Marvell is a leader in this area. With a multi-year contract with Amazon (AMZN) and expertise in custom silicon AI solutions, Marvell can boost revenue and reduce its high valuation. With a relatively low market cap compared to its competitors, I believe Marvell has the biggest potential growth in this field.

Marvell Portfolio

In my opinion, the most interesting part of Marvell is its products for data centers. It represented 69% of revenue in Q2 and 73% in Q3. It includes the custom silicon AI, electro-optic, and networking products. I will expand on those products later.

In addition, Marvell provides products for IT networking (10% of revenue), telecom industries (6% of revenue), gaming and electronic products (5% of revenue), and the automotive industry (5% of revenue).

Valuation

Marvell is trading at a premium valuation. The P/E stands at 80x, which is extremely high compared to the peers, which stand at 24x. If we compare it to AMD, the P/E stands at 39.48x, much lower. The EV/EBITDA stands at 89x compared to the peers at 19x. Broadcom's EV/EBITDA stands at 44.74x, lower by half. However, I think the focus here needs to be on the forward valuation.

PEG Non-GAAP (fwd) stands at 1.96x, narrowing the gap to its peers, at 1.81x. Broadcom's PEG Non-GAAP(FWD) is 1.66x, not far behind. I think the FWD metrics look better than the TTM, which indicates possible growth in the future.

Valuation Grade and Underlying Metrics

MRVL Valuation Grade F

	Sector Relative Grade	MRVL	Sector Median	% Diff. to Sector	MRVL 5Y Avg.	% Diff. to 5Y Avg.
P/E Non-GAAP (TTM)	D-	80.52	24.06	234.74%	43.19	86.44%
P/E Non-GAAP (FWD)	D-	73.93	24.56	201.02%	38.56	91.73%
P/E GAAP (TTM)	-	NM	29.86	NM	-	NM
P/E GAAP (FWD)	-	NM	30.22	NM	-	NM
PEG GAAP (TTM)	-	-	1.14	-	-	-
PEG Non-GAAP (FWD)	C	1.96	1.81	8.36%	1.88	4.27%
EV / Sales (TTM)	D-	19.18	3.32	477.89%	11.10	72.77%
EV / Sales (FWD)	F	17.94	3.22	457.62%	10.09	77.78%
EV / EBITDA (TTM)	D-	89.56	19.08	369.48%	53.03	68.89%
EV / EBITDA (FWD)	D-	52.99	15.32	245.97%	30.28	75.02%
EV / EBIT (TTM)	-	NM	25.23	NM	-	NM
EV / EBIT (FWD)	D-	62.70	21.29	194.48%	34.91	79.62%
Price / Sales (TTM)	F	18.53	3.15	488.23%	9.98	85.69%
Price / Sales (FWD)	F	17.34	3.14	453.05%	9.48	82.91%

Seeking Alpha

The revenue YoY growth trend is clear, improving from -12% in Q1 to -5% in Q2 to +6% in the last quarter, and is projected to grow to 26% in the next quarter.

Revenues Y-Y	-12.2%	-5.1%	6.9%	26.2%
	1QFY25	2QFY25	3QFY25	4QFY25
	31.4.24	31.7.24	31.10.24	30.01.24
Net revenue	1,160,900	1,272,900	1,516,100	1,800,000

Revenue YoY growth

In addition, the company announced a buyback program of \$525m through FY2025. On the balance sheet, the company has a long-term debt of \$3.97B, which is high compared to the cash of \$868m. However, operating cash flow stands at \$536m, which grew 75% sequentially. In the last quarter, the revenue grew 6% YoY. But if we dive inside, we'll see that data center revenue grew 98% YoY - this leads me to the main point, why I believe Marvell is a top pick for 2025. Marvell is considered a leading innovative company in the data center AI infrastructure segment. Let's dive into the AI chip market for a better understanding of growth potential.

The AI Story

From the Precedence Research report, AI chip demand is projected to surpass \$927B by 2034, a CAGR of 28.90%. There is now a shift in the market, custom silicon AI are becoming more popular in AI infrastructure alongside the general-purpose GPUs, thanks to its ability to reduce costs, and more efficient process for specific tasks. One example of Marvell's custom AI capabilities is the high-bandwidth memory, which improves performance and reduces costs for hyperscale data centers. This shift is very important because it enables more smaller companies to use AI. Marvell's expertise in custom silicon positions the company to benefit from this market change. It projects AI revenue to exceed \$2.5 billion by fiscal

2026. In general, the company meets its forecast range. So, I don't see any reason this will change now. Marvell estimates the total addressable market of \$75B, of which \$40B is for custom silicon AI. Marvell aims to capture 20% of the \$40B, indicating \$8B annually over time, now it's around \$1B just from custom silicon AI. During the Q3 earnings call the chairman, Matt Murphy, said:

We are seeing strong custom AI demand continue into the fourth quarter and have secured supply chain capacity to support our customers' growth forecasts.

Marvell is a leader in custom silicon AI alongside companies like Broadcom. For this reason, I also think it makes more sense to compare Marvell to Broadcom rather than to other chip companies, such as AMD, which is more focused on GPUs, or Micron, which focuses on the memory market with DRAM and NAND. While Broadcom, a \$1T company, has a broad market presence, with Hyperscalers, and has income from semiconductors and infrastructures, Marvell has fewer customers, and therefore has more room to grow. Broadcom's revenue grew 51% YoY, while Marvell just 6%. Broadcom's P/E ratio is 46.2x, compared to Marvell's 79.8x. Additionally, Broadcom's forward EV/S is 18.19, slightly higher than Marvell's 17.82. Yes, I can't deny it. Marvell is expensive compared to Broadcom, both are excellent companies, which leading the new phase in AI semiconductors. However, I think Marvell's high valuation just reinforces the expectation from the company for higher growth in the coming years.

In addition to custom silicon, Marvell launched in the last quarter the industry's first 3-nanometer 1.6T DSP, featuring 200-gig per lane electrical and optical interfaces. This 1.6T digital signal processor is part of Marvell's electro-optics division, which provides critical components for data centers. Shipments have already begun, and Marvell expects the production ramp to accelerate next year. There are significant bookings for related products like 800G PAM DSP, which indicates strong market demand. During the Q3 earnings call, Matt Murphy said:

We continue to see strong bookings for our market leading 800-gig PAM products, and we also began shipments of the industry's first 1.6T PAM DSP and 5-nanometer process technology. We continue to see a strong design win momentum with leading customers for this product and expect the production ramp to accelerate next year.

AWS Partnership

Recently, Marvell secured a major customer with a multi-year contract with Amazon. This is a significant milestone for Marvell. Amazon increased significantly its capex in AI infrastructure in FY2024, and is expected to continue increasing in FY2025. Amazon develops its Trainium2 AI chips for AI models, which are supported by Marvell's products, including optical DSPs, active electrical cable DSPs, Ethernet switching silicon solutions, and more. I believe Amazon's chip demand can grow in the future and, as a result, influence the demand for Marvell's products. So I think this multi-year contract is a huge gift for Marvell's revenue. During the Q3 earnings call, Matt Murphy said:

This multi-generational agreement encompasses a broad range of Marvell's data center semiconductors, including custom AI products, optical DSPs, active electrical cable DSPs, PCIe retimers, data center interconnect optical modules, and Ethernet switching silicon solutions.

From this agreement, we can learn about Marvell's leadership and innovative technology in the AI data center infrastructure. As a hyperscaler, Amazon can boost Marvell's revenue with high demand for its products. The chairman, Matt Murphy, mentioned it in the earnings call:

For us as a supplier to them, as you pointed out -- first of all, it's a five-year agreement. It covers AI custom products as well as a broad range of networking products. It's significant in its -- in the revenue that it's going to drive for us. And most importantly, it is multi-generational in nature. So, with this agreement and with these kinds of relationships that we're building with these customers, we have even more confidence than before to achieve our goals that we're driving

Not Just An AI Player

So, as I described in this article, I think Marvell is trading at a premium valuation, mostly because of its data center activity. However, Marvell leads in other fields too.

Marvell provides Ethernet-based automotive solutions to enable high-speed, real-time communication within vehicles. This is critical for autonomous systems.

Risks

China - As of 2023, nearly 42% of Marvell's total revenue came from China. Tariffs or sanctions on China imposed by the incoming Trump administration would not be beneficial for Marvell. However, and this is a significant "however", Marvell is reducing its dependence on China. The massive growth coming from AI is less reliant on China, as evidenced by the contract Marvell signed with Amazon. Therefore, in my opinion, this risk should be taken with caution.

Competitors - The AI industry is on fire, and everyone wants to be part of the revolution. There are many semiconductor companies, from AMD, Intel, Arm, and of course, Nvidia. In my opinion, the main competitor for Marvell is Broadcom, but all of these companies are capable of developing new innovative technologies, which can be a threat to Marvell. This is a very dynamic market.

The last Risk is the cyclical nature of the semiconductor industry. I think in this area, you need to walk very carefully. Prices are influenced by demand and supply, which impacts the company's revenue. However, while DRAM and NAND are more sensitive to cycle prices, Marvell products are more stable.

Bottom Line

I think Marvell can become one of the leaders in the next phase of the AI data center chip market. With significant growth projected in the AI sector, Marvell has the potential to reduce its high valuation and increase its customers. In my opinion, this is the best option for those looking for exposure to the semiconductor market in 2025.

Nvidia CEO Huang confirms TSMC advanced packaging needs are shifting

Jan 16, 2025 Brandon Evans



Chip Somodevilla/Getty Image

Nvidia (NASDAQ:NVDA) CEO Jensen Huang confirmed the company's advanced packaging needs from Taiwan Semiconductor Manufacturing Company (NYSE:TSM) are changing, according to a report by Reuters.

Blackwell, Nvidia's latest artificial intelligence chip, utilizes chip-on-a-wafer substrate, or CoWoS, advanced packaging.

An analysis issued yesterday by Ming-Chi Kuo with TF International Securities concluded that the majority of its Blackwell packaging would utilize CoWoS-L over CoWoS-S.

Co-WoS-S has a high production cost and uses a single silicon interposer, which sometimes faces yield issues. The CoWoS-L is newer tech produced by TSMC. It incorporates active components in the silicon interposer, which is intended to enhance chip design and packaging flexibility. It is also less expensive than the CoWoS-S.

"As we move into Blackwell, we will use largely CoWoS-L," Huang said at an event by Siliconware Precision Industries in Taiwan on Thursday, according to Reuters. "Of course, we're still manufacturing Hopper, and Hopper will use CoWoS-S. We will also transition the CoWoS-S capacity to CoWos-L."

"So it's not about reducing capacity," he added. "It's actually increasing capacity into CoWoS-L."

Semiconductor revenue growth slows to single digits in 2025: Susquehanna

Jan 22, 2025 Brandon Evans

Global semiconductor revenue is expected to slow to mid-single digits in 2025, which marks a steep fall from the 20% growth seen in 2024, according to a forecast by Susquehanna.

Global wafer fab equipment spending is expected to drop to \$94B in 2025, which represents a 6% decline from 2024.

"Although Taiwan Semiconductor Manufacturing Company (NYSE:TSM) (+\$8B) and Memory (+\$5B) are expected to show Y/Y increase, a mix of lower spend in China (-\$10B), Samsung (OTCPK:SSNLF) Foundry/IDF (-\$6B), and non-China IDMs (-\$2B) is expected to lead to lower spend," said Susquehanna analyst Mehdi Hosseini, in a Wednesday note.

However, WFE spending is expected to bounce back to \$100B in 2026, while global semi revenue growth forecast to increase by 8% in 2026.

In the near term, Susquehanna finds potential upside for semiconductors in the data center, PC and mobile sectors, while uncertain demand and elevated inventory likely limit a broad-based recovery. The choppy forecast resulted in Susquehanna adjusting price targets across a range of semiconductor stocks.

Arm Holdings (NASDAQ:ARM) price target increased to \$140 from \$118, ON Semiconductor (NASDAQ:ON) cut to \$70 from \$80, Impinj (NASDAQ:PI) reduced to \$220 from \$260, Lattice Semiconductor (NASDAQ:LSCC) raised to \$70 from \$55, MaxLinear (NASDAQ:MXL) raised to \$25 from \$20, Synaptics (NASDAQ:SYNA) increased to \$105 from \$95 and Wolfspeed (NYSE:WOLF) lowered to \$7 from \$10.