Company Analysis Report

ASML Holding N.V. (NASDAQ: ASML)

ASML

Investment Highlights

Position Rating:	SELL		Target Price:	612.9 (-12.4%)
YTD Change:	+15.28%		P/E Ratio:	33.91 (Dec 7th 2023)

Key statements:

- ASML's revenue is increasingly driven by sales of logic chips, reflecting the industry's shift towards more complex and advanced semiconductor manufacturing.
- Chinese chipmakers are accelerating imports in 2023 due to impending Dutch export restrictions, indicating a potential surge in ASML's short-term sales in China.
- The market may need to adjust expectations for ASML's growth in China (account for 15% in total customer base historically), considering the high risk and potential for inconsistent growth due to geopolitical factors and export controls.

Figure 1 Stock price comparison with the market and industry index
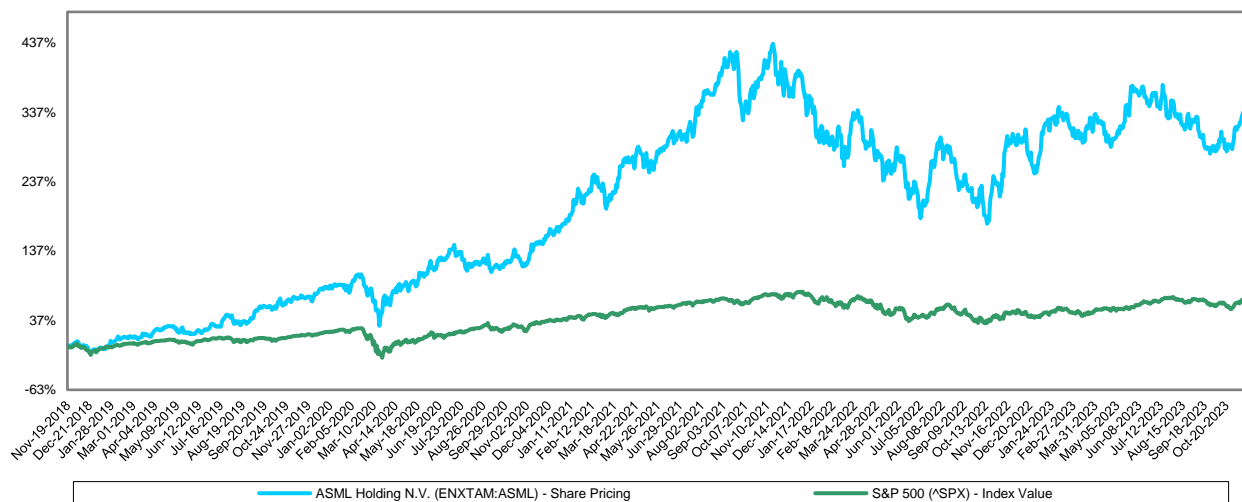
Investment Team: Heyu Wang, Sirui Chen
**2023 Dec 6th**

1. Company Introduction

Business Description

ASML develops, produces, markets, sells, and services advanced semiconductor equipment systems consisting of lithography, metrology, and inspection systems for memory and logic chipmakers. The company provides extreme ultraviolet lithography systems; and deep ultraviolet lithography systems comprising immersion and dry lithography solutions to manufacture various range of semiconductor nodes and technologies. It also offers metrology and inspection systems, computational lithography products, software, and services. ASML's cutting-edge equipment systems find direct application among key industry players like TSMC, Samsung, Intel, and others. ASML was founded in 1984 and is headquartered in Veldhoven, the Netherlands.

ASML's Product Lines:

- EUV (Extreme Ultraviolet Lithography) system: the world's only producer of EUV system, which is crucial for creating the finest features on microchips, accounts for 33% of ASML's revenue.
- DUV (Deep Ultraviolet Lithography) system: includes ArF Immersion (ArFi) at 25%, Krypton Fluoride (KrF) at 8%, and ArF Dry at 3%, summing to 36% of total sales.
- Metrology & Inspection devices: essential for wafer and chip quality control, contributes 3%. I-Line technology represents 1%.
- Net Service & Field Option: this service segment account for the remaining 24% of ASML's revenue for FY 2022.

Figure 2 Revenue segment in FY 2022
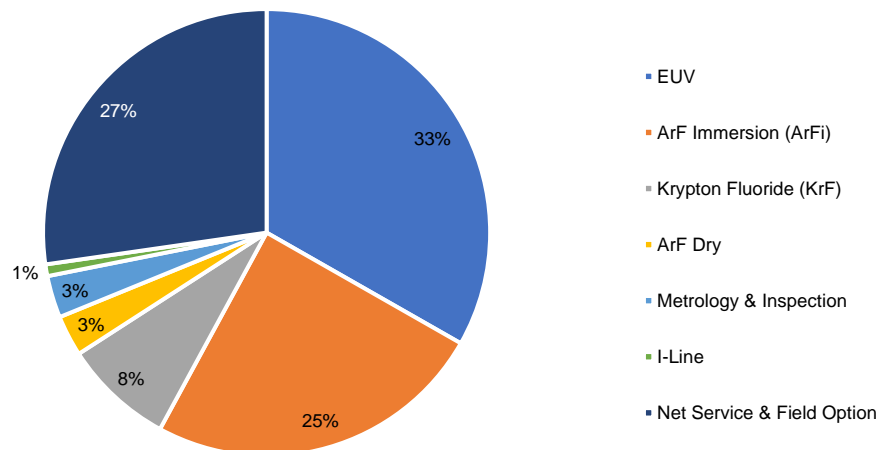
EUV technology is used for the most advanced chipmaking process, allowing the smallest features to be printed on microchips. It's a cutting-edge process that allows for greater miniaturization and is crucial for manufacturing the latest generation of semiconductors. EUV has seen rapid development and growth over the past decade. For ASML, the EUV market has matured significantly, now nearly matching the sales of DUV technologies.

Figure 3 Sales by segment (in millions of USD)
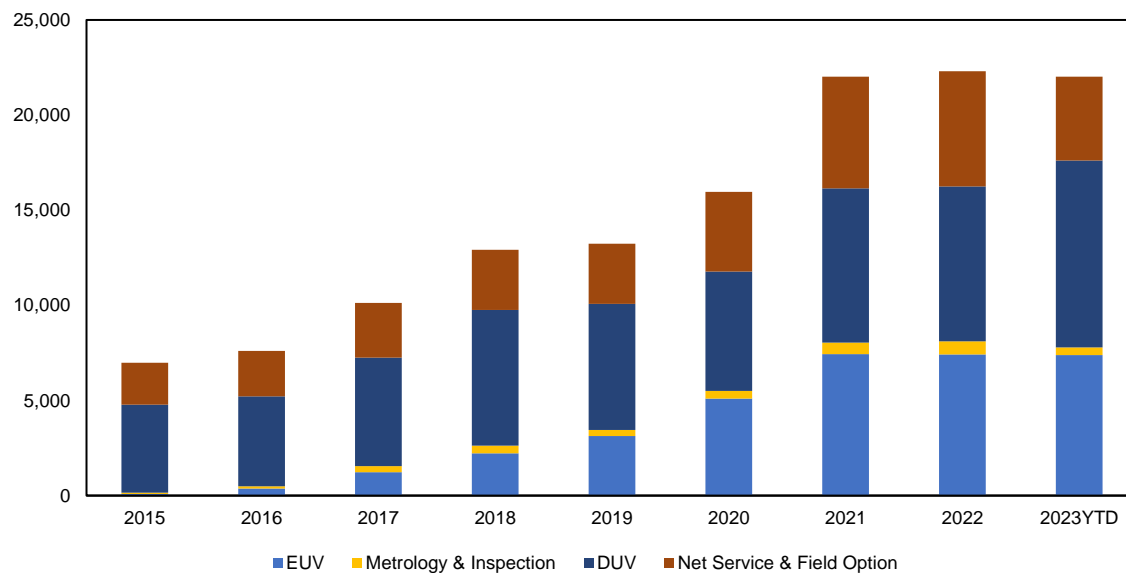
2. Sales Forecast

2.1 Equipment System

Methodology

Our sales projection consists of three parts: Market driven growth + Technology driven changes +Geopolitical impacts. These components are considered in parallel and without overlap, each offering a unique contribution to our sales forecast.

Market expansion (section 2.1.1): The market component of our sales projection applies growth rates from two key downstream semiconductor industries: logic and memory. By analyzing the growth rates in these sectors and considering their respective revenue shares, we've calculated ASML's growth rate.

Technology changes (section 2.1.2): The Technology Driven Change component acknowledges that, despite overall market growth, adjustments within the market are necessary due to technological advancements. As technology progresses, customers may increasingly prefer to purchase equipment capable of producing more advanced chips, while reducing their investment in more mature equipment. This shift can lead to either an increase or decrease in revenue.

Geopolitical impacts (section 2.1.3): The Geopolitical component is influenced by recent Dutch export restrictions to China, which represent an external influence on ASML's operations, independent of market dynamics or technological advancements, and must be considered separately.

By summing these components, we gain a comprehensive and multi-faceted projection of future revenue.

2.1.1 Market Driven Growth

To calculate the market driven growth on ASML's revenue, we calculate the growth rate for semiconductor industry first with logic and memory segments' growth rate separately. Then we calculate the growth rate for semiconductor manufacturing equipment (SME) industry by running a regression model, with logic and memory segments' growth rate separately as well. Then we forecast the future ASML sales by multiplying the revenue percentage shares of memory and logic chips with their respective growth rates.

Step 1: Forecasting on future semiconductor industry growth rate

The semiconductor industry is divided into two main types of chips: logic and memory. Logic chips are used for processing data, while memory chips are used for data storage. Generally, the memory market exhibits more cyclical patterns compared to logic. To forecast future logic and memory chip market growth rate, we reference industry data from McKinsey but made specific adjustments based on our insights. These adjustments, along with their underlying reasons, are detailed below.

Figure 4 Semiconductor industry growth driven by different downstream markets [1]
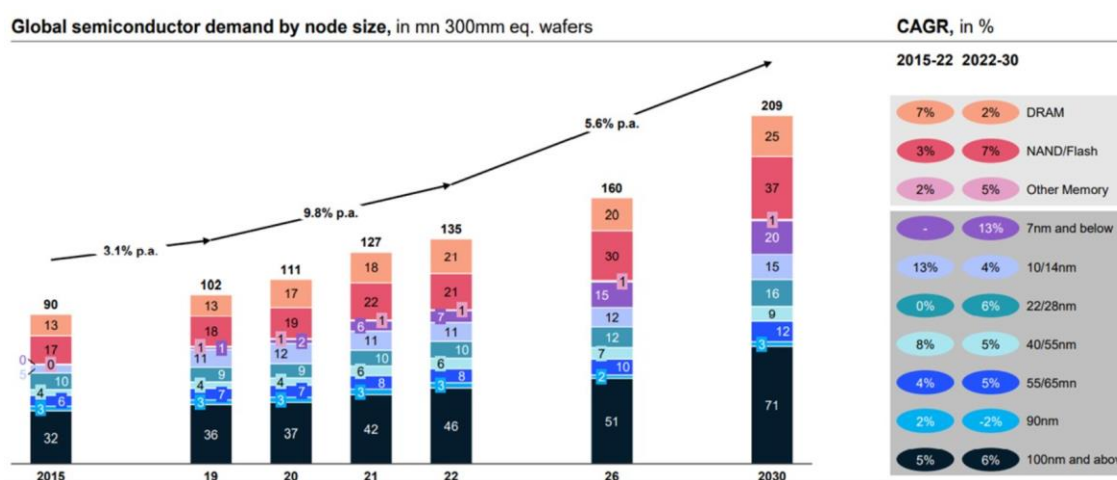
- **DRAM (Dynamic Random-Access Memory):** This type of memory chip is crucial for data storage and processing. Despite McKinsey projecting a 2% CAGR from 2022 to 2030, we believe this is too conservative. Based on our previous report on Applied Materials, including factors like replacement demand from PCs and the rise of advanced portable devices, DRAM market will increase at a stable growth rate in the following years. Based on Semiconductor Industry Association (SIA)'s report, we expect a more robust industry-wide CAGR of **5%** for DRAM[2], which is slightly lower than the 7% CAGR from 2015 to 2022, as shown in the chart above.
- **Logic Chips (mature process, 28nm and above):** Chips manufactured at mature nodes (28nm and above) are widely used in several industrial and automotive appliances. Before, the average CAGR for matured process chips is **4.9%** from 2015-2022. We apply the same CAGR in the following years, based on our anticipation that the demand for matured process chips will steadily expand alongside overall economic growth.
- **Logic Chips (10/14nm, and 7nm and below):** Considering the semiconductor roadmap of major markets like China, Taiwan, and South Korea, we expect the 10/14nm chips to maintain a significant

- presence, projecting a **5-6% CAGR** in the next 5 years. This number is derived from the CAGR of 100nm and above node size chips from 2015-2022. We believe that 10/14nm chips are in the early stages within the emerging market, poised to follow a trajectory like previous instances when chips of 100nm and larger node sizes entered this market in past years. For the smaller 7nm and below node size chips, we apply the average CAGR of 10/14nm and 28nm chips in 2015-2022, anticipating a **11.2%** CAGR, which is more conservative than ASML's original expectation (15%) and McKinsey's forecast (13%). This number is calculated by this formula:

$$2015 - 2022 \; CAGR \; for \; 10/14nm \; and \; 28nm \; chips \; = \; (21/10)\textasciicircum(1/7) - 1 = 11.2\%$$

- Applying future different CAGR of different node size chips to current semiconductor demand status, we have **an adjusted average CAGR for logic chips of 8.9%**.

Considering the semiconductor industry cycle, we could see that during the notable expansions of the memory market in 2013, 2015, 2018, and 2021, when over 50% of ASML's device revenue originated from memory customers. This trend suggests a potential industry cyclical pattern spanning approximately 24-36 months. Therefore, applying the semiconductor industry cycle (could also be explained by the Moore's Law), and the CAGR for DRAM and logic chips above (5% for memory chips and 8.9% for logic chips), we could derive the future growth rate for logic and memory market each year.

*Figure 5 Logic, memory, and total semiconductor industry growth rate*
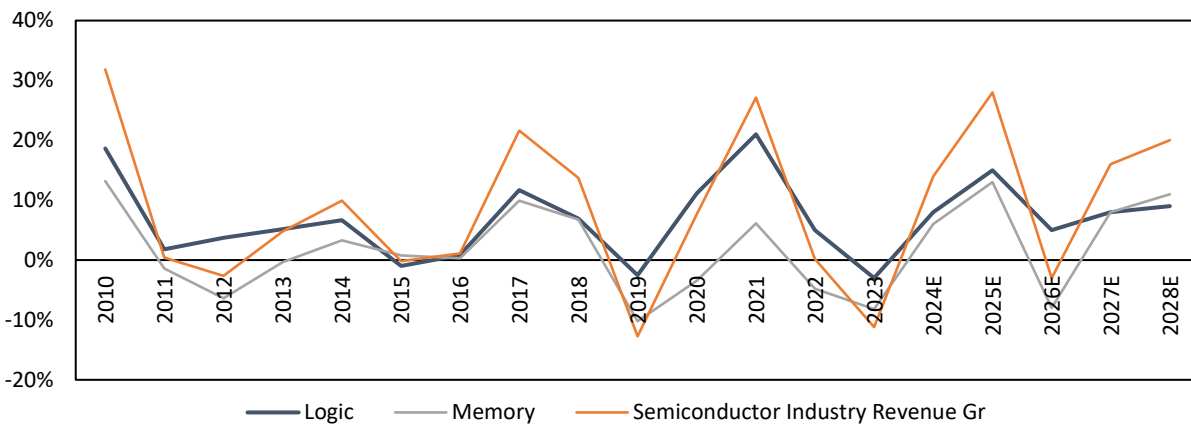
Step 2: Forecasting on future SME industry growth rate

As the upper stream industry of semiconductor industry, the SME industry has a growth rate which has a strong correlation with the semiconductor industry (Correlation Coefficient is 0.83).

Figure 6 Semiconductor industry growth rate and SME industry growth rate
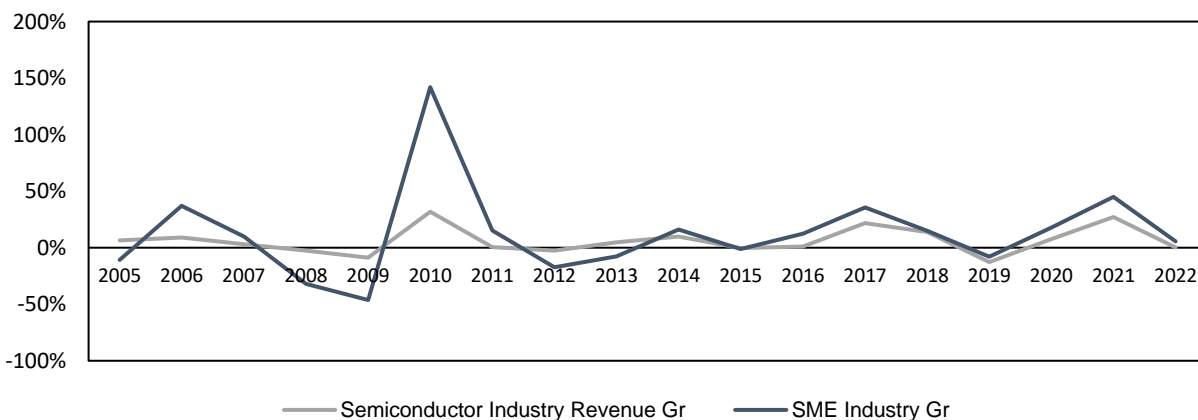
To forecast the SME industry growth rate, we run a regression model for using semiconductor industry growth rate as an independent variable and SME industry growth rate as a dependent variable. The model is represented as:

$$SME\ Industry\ Gr\%_t = \beta_0 + \beta_1 \times Semiconductor\ Industry\ Gr\%_t$$

From the Ordinary Least Squares (OLS) analysis using R, the coefficients were determined as:

- Intercept (β_0): -0.04
- Coefficient (β_1): 2.79
- R-square: 0.68

Using this regression model and the results from step 1, we could derive our future forecasts for Logic and Memory chips for SME industry growth rate.

Table 1 Industry growth rate for logic and memory SME

	2023	2024E	2025E	2026E	2027E	2028E
Logic SME	-12%	18%	38%	10%	18%	21%
Memory SME	-27%	13%	32%	-26%	18%	27%

**Step 3: Forecasting on future ASML sales**

We calculate the impact of market growth by multiplying the revenue percentage shares of memory and logic chips with their respective growth rates.

$ASML\ Growth\ Rate\ Driven\ by\ SME\ Market$
$= Revenue\ share\ of\ logic\ chip\ for\ ASML * Logic\ chip\ SME\ growth\ rate$
$+ Revenue\ share\ of\ memory\ chip\ for\ ASML * Memory\ chip\ SME\ growth\ rate$

Revenue Segment from End-market: When analyzing ASML's historical revenue, in recent years, with the introduction of advanced EUV lithography equipment, there has been a shift towards more revenue from logic chips, used in advanced manufacturing processes.

Figure 7 ASML's sales by chip type (logic and memory)
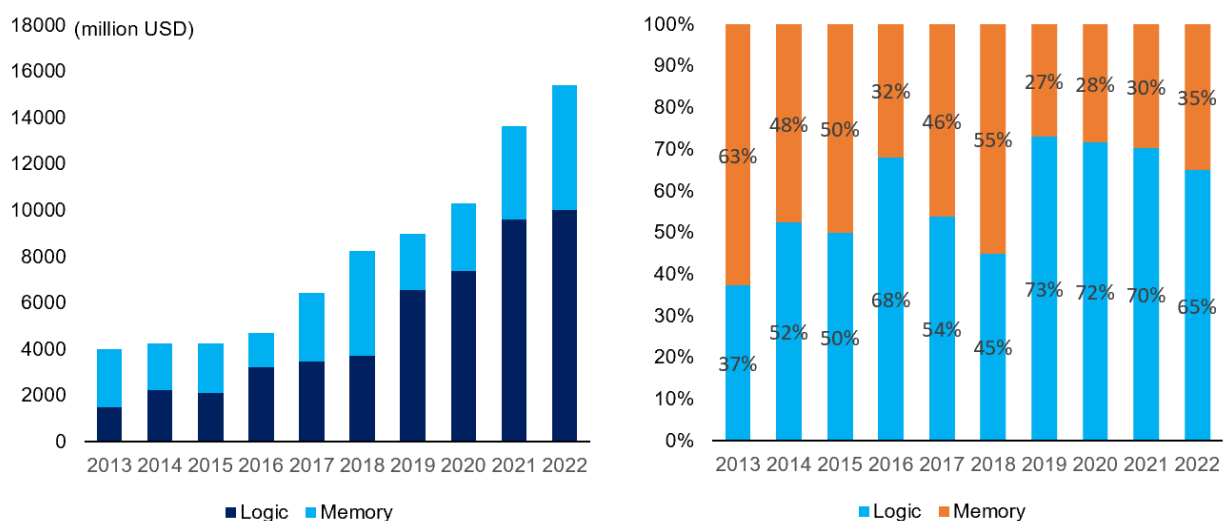
Observing the increasing share of logic chips in ASML's revenue over the past few years, we anticipate that this trend will continue into the future. The increasing share of logic chips in ASML's revenue is driven by customer demand for more complex and precise logic chips. Consequently, we project the following

distribution of shares for logic and memory chips over the next five years. The forecasts on future percentages are based on several assumptions:

- Observing the cyclical pattern from 2016-2018, and from 2019-2022, we assume there is a cyclical feature of logic percentage as of ASML's total revenues.
- For this year, we already knew that approximately 77% of revenues are derived from logic chips, and we assume a 2% decreasing starting next year, displaying similar trend to the former cycle.
- In year 2026, we think this is the start year for a new cycle (given Step 2 results, memory SME will drop 26% sales this year), and we apply an 82% percentage to logic chip's percentage.

Table 2 Revenue segment by logic and memory chips

	2023	2024E	2025E	2026E	2027E	2028E
Logic	77%	75%	73%	82%	80%	78%
Memory	23%	25%	27%	18%	20%	22%

Multiplying the market growth rates from Step 2 with the future percentage of ASML's revenue segment, we can derive future ASML's total revenue and growth rate accordingly.

Figure 8 ASML total revenue Gr%
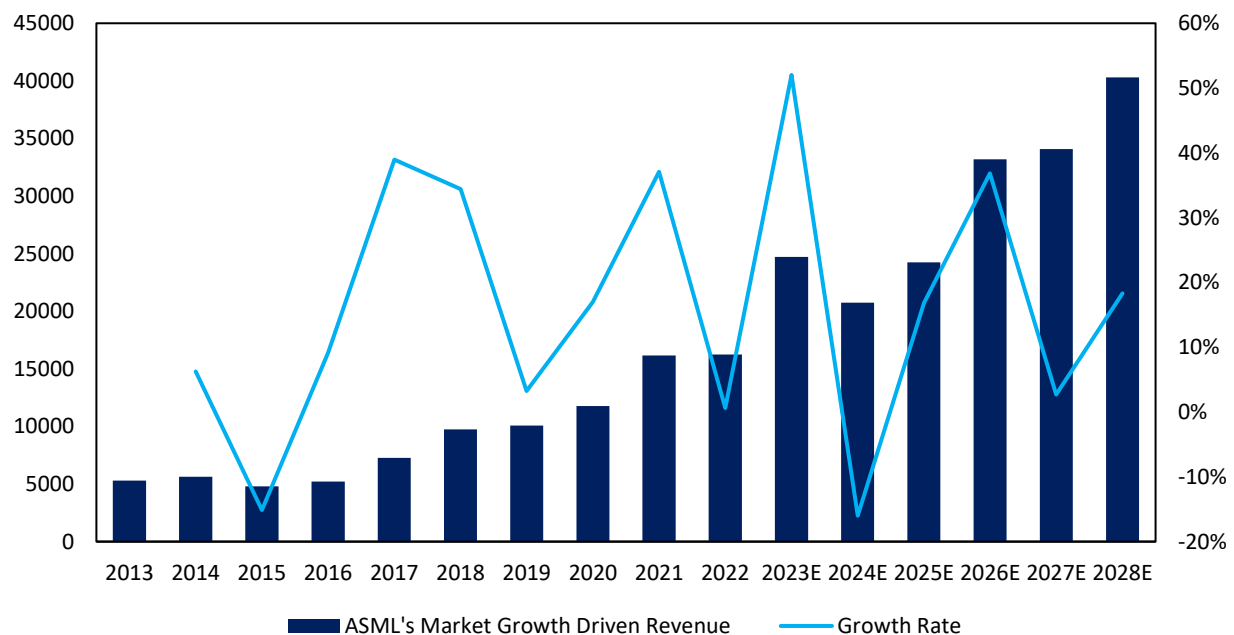
2.1.2 Technology Driven Change

As the semiconductor industry progresses, there is a continual push for smaller, more efficient, and high-performance chips. This evolution in chip technology requires the use of more advanced and precise lithography equipment like Low-NA EUV and High-NA EUV, leading to an increase in their sales. As a result, older lithography systems are gradually being phased out, leading to a potential decrease in their sales.

Figure 9 Technology advancement in downstream market[3]
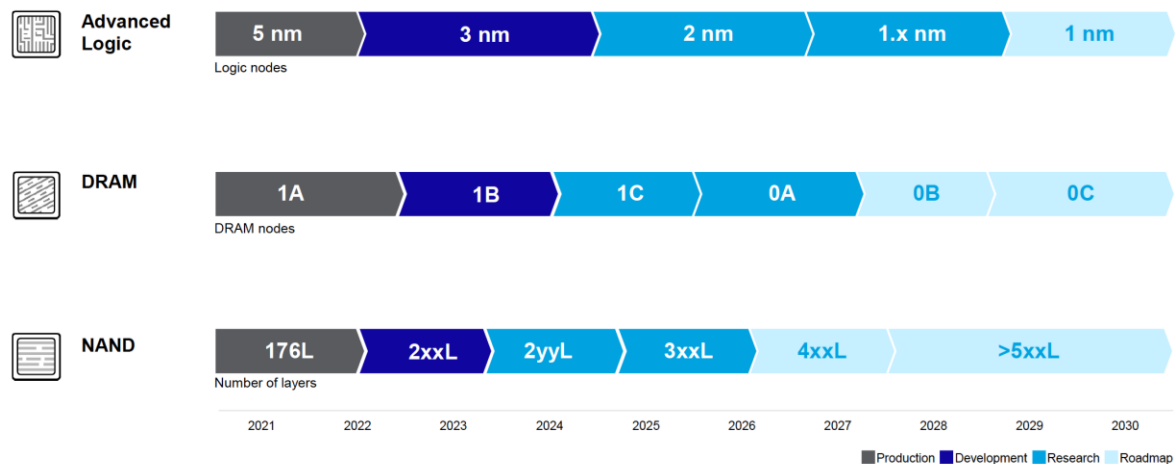
As illustrated in the figure, we observe a diverse distribution of equipment demand across different types of chips: Advanced Logic, DRAM, and NAND. Using these data, we will be able to calculate the demand of different types of products made by ASML and the increase in future sales due to technology advancement.

Figure 10 Diverse demand of equipment across chips
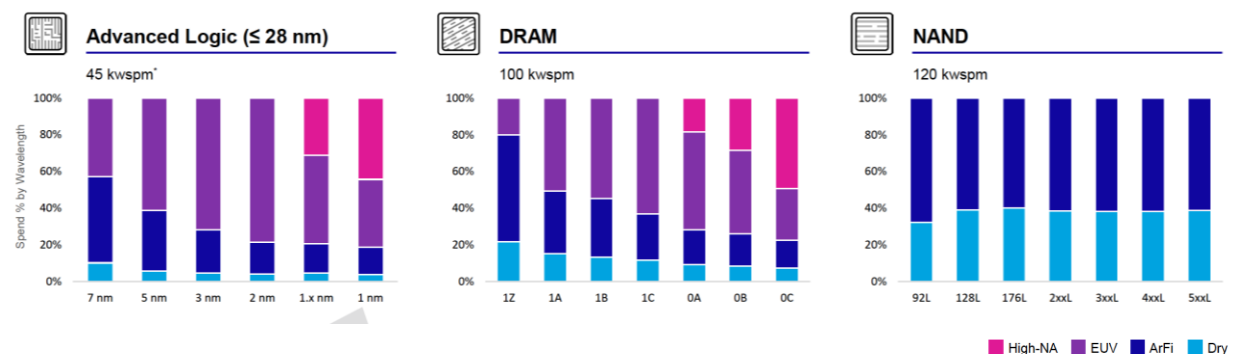
Production Capacity per Equipment: As shown in the figure above, the capacity per equipment for Advance Logic chips is 45 kwspm (1000 wafer per month), 100 kwspm for DRAM, and 120 kwspm for NAND.

Price of Each Type of System: Using the number of systems sold by ASML and the revenue by segments in 2022, we can calculate the price of each type of system. Since ASML has not started selling the high-NA system, but in some news[4], it has revealed the approximate cost of high-NA product is approximately

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[3] ASML investor day presentation

[4] https://www.reuters.com/technology/intel-orders-asml-machine-still-drawing-board-chipmakers-look-an-edge-2022-01-19/

$340 million. Additionally, the cost of its current EUV systems are $154 million, and the price is $183.41 million, giving us a gross margin of 15.8%. We estimate the price of High-NA system using the same gross margin. We also assume that the price remains constant in the future (due to inflation and competition).

Table 3 Price and Sales of Products

	Unit Sold	Sales in 2022 ($ M)	Price ($ M)
EUV	40	7340.40	183.51
ArFi	81	5446.47	67.24
High-NA	0		405.00
ArFi Dry	28	652.47	23.30
KrF	151	1758.29	11.64
I-line	45	186.64	4.15
Metrology and Inspection	216	672.40	3.11

Demand of each type of chip: Using the number of products sold by ASML in 2022, we can estimate the total demand downstream of each type of chip.

Table 4 Demand of each type of chips

	Production in kwspm per equipment	Demand in kwspm
Advanced Logic	45	17,500
DRAM	100	40,000
NAND	120	72,000

Using all the information above, we can calculate the future unit sales of each type of equipment.

For example, High-NA sales in 2028 will be calculated in this way:

1. According to Figure 9, they will be producing 1.x nm chips in 2028.
2. According to Figure 10, there will be 55% of the 1.x nm Advanced Logic chips produced by High-NA systems in 2028.
3. Applying the demand in Table 4, the demand for High-NA produced chips will be 30%*17,500 = 5250 kwspm.
4. This number divided by Production in per Logic equipment per year is 5250/(45*12 months) = 9.7 units.

Same goes for DRAM chips since DRAM will be using High-NA systems as well. 28%*40,000/(100*12) = 9.3 units. Adding these two together, we have estimated High-NA unit in 2028 equals to 9.7+9.3=19.06.

Table 5 Estimated future sales (Unit)

	2022	2023	2024	2025	2026	2027	2028
EUV	40.00	41.02	42.69	44.31	39.31	29.58	27.92
ArFi	81.00	76.95	73.10	69.45	65.98	62.68	59.54
High-NA	0.00	0.00	0.00	0.00	6.00	15.72	19.06
ArFi Dry	28.00	28.57	26.62	26.62	24.95	24.95	24.95
KrF	151.00	151.00	151.00	151.00	151.00	151.00	151.00
I-line	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Metrology and Inspection	216.00	216.00	216.00	216.00	216.00	216.00	216.00

The change in revenue due to technology advancement can be calculated by multiplying the price of each product by unit sales. KrF, I-line and Metrology have no change because they are only related to mature market with few technology advancements.

Table 6 Change in revenue due to technology advancement

	2023	**2024**	**2025**	**2026**	**2027**	**2028**
EUV	186.9	305.9	297.4	-917.6	-1784.1	-305.9
ArFi	-272.3	-258.7	-245.8	-233.5	-221.8	-210.7
High-NA	0.0	0.0	0.0	2430.0	3937.5	1350.0
ArFi Dry	13.4	-45.5	0.0	-38.8	0.0	0.0
KrF	0.0	0.0	0.0	0.0	0.0	0.0
I-line	0.0	0.0	0.0	0.0	0.0	0.0
Metrology and Inspection	0.0	0.0	0.0	0.0	0.0	0.0
Total Changes	**-72.0**	**1.6**	**51.6**	**1240.1**	**1931.6**	**833.4**

2.1.3 Geopolitics Driven Change

This year, we've observed rapid growth in China's market. According to ASML, this is largely driven by significant investments in renewable energy, as well as the expansion of electric vehicle (EV) manufacturing capacity and industrial IoT. The majority of ASML's shipments to China are for mid-critical to mature semiconductor tools, supporting this growth. We have included this growth in the previous market driven growth part.

Figure 11 ASML sales from China
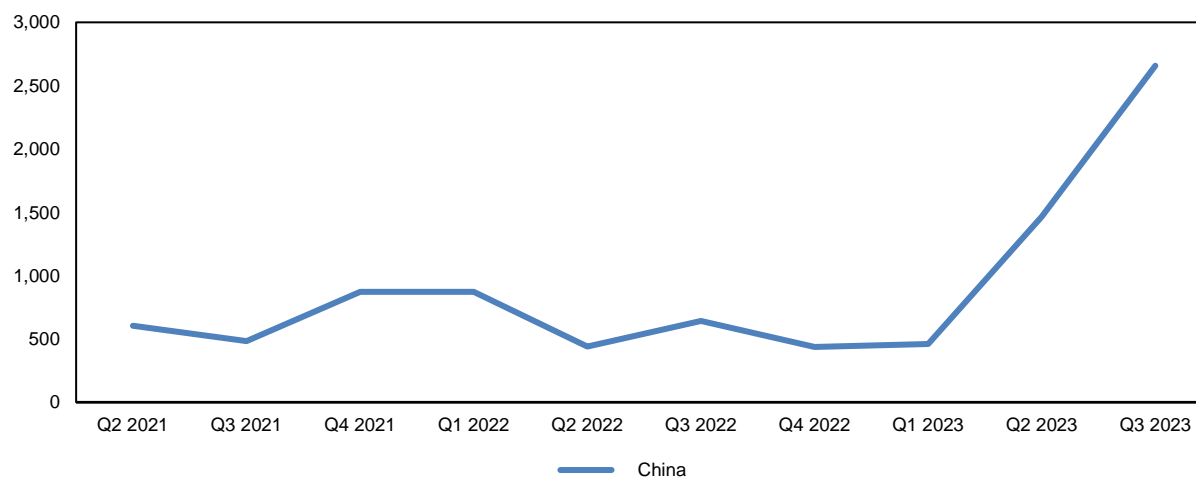
However, we believe that this year's growth from China may be attributed to Chinese chip makers aggressively stockpiling devices in anticipation of Dutch export controls. The Dutch government has announced new export control regulations concerning semiconductor equipment. According to a statement released by ASML on June 30, 2023[5], the new Dutch export control regulations will come into effect on January 1st, 2024, particularly affecting the export of ASML's TWINSCAN NXT:2000i and subsequent

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[5] https://www.asml.com/en/news/press-releases/2023/statement-regarding-export-control-regulations-dutch-government

immersion systems to China. This will affect 10% to 15% of ASML's exported chip manufacturing technology to China[6]. We used the median value of 12.5% to predict future impact on China's sales.

We forecast China's sales without geopolitical impact based on the previous Market Driven Growth analysis and Technology Driven Change analysis, and we applied the growth rate on China's sales to get the next five year's sales. Then, we used the median value of 12.5% to predict future geopolitical impact on China's sales. The results are shown in Table 7.

Therefore, on top of the market-driven and technology-driven growth that we've already calculated, we must now factor in the impact of geopolitical reasons on ASML's growth.

Table 7 Geopolitical Impact on Sales

|	2023E	2024E	2025E	2026E	2027E	2028E
China's Sales without Geopolitical Impact	6108	7490	8539	8637	10878	12833
Geopolitical Impact on China's Sales	-763	-936	-1067	-1080	-1360	-1604

By incorporating three parts together: Market driven growth + Technology driven changes + Geopolitical changes, we can more accurately forecast ASML's system sales growth.

Table 8 Total System Sales

	2023	**2024**	**2025**	**2026**	**2027**	**2028**
Market Driven Growth	24707	20755	24245	33178	34072	40314
Technology Driven Change	-72	2	52	1240	1932	833
Geopolitical Impact	-763	-936	-1067	-1080	-1360	-1604
Total System Sales	**23,872**	**19,821**	**23,229**	**33,338**	**34,644**	**39,544**

2.3. Service and Field Option Sales

Figure 12 Net System Sales v.s. Net Service Sales

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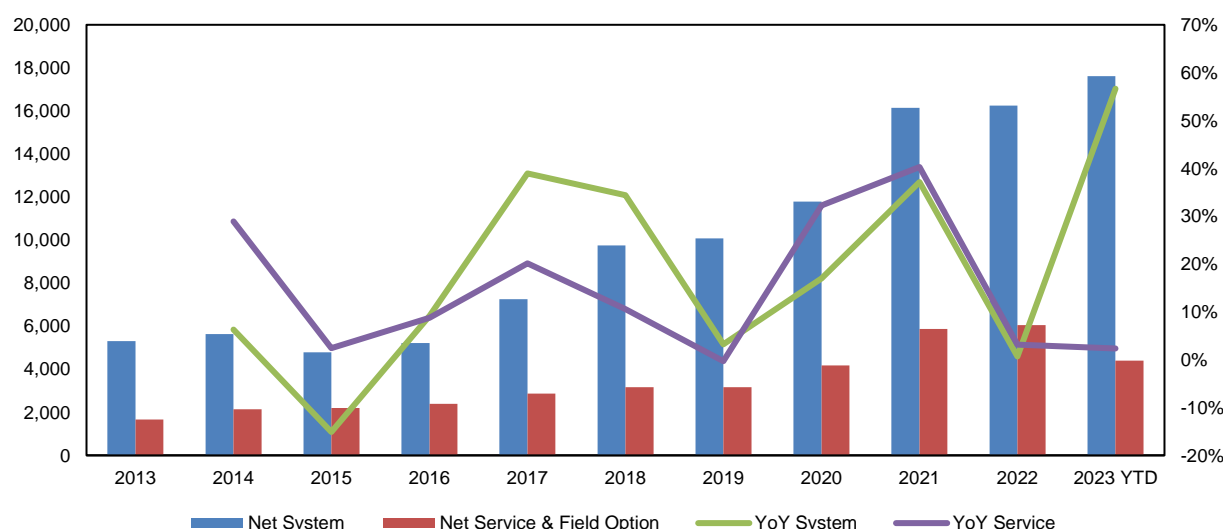
[6] ASML 2023 Q3 Earnings Call

Growth in service and field option sales was primarily driven by the continued scaling of customers' installed base, which resulted in increased service sales to support ASML's systems used in their ongoing operations during the systems life cycle. Thus, we believe the current year service and field option sales is closely related to system sales in the past.

We conducted a linear regression analysis focusing on the relationship between the Net System Year-over-Year (YoY) change from three years ago and the current year's Net Service YoY change. Our goal was to develop a model that could help in predicting current service revenue trends based on past system sales performance. The model is represented as:

$$\Delta Service_t = \beta_0 + \beta_1 \times \Delta System_{t-3}$$

From the Ordinary Least Squares (OLS) analysis using R, the coefficients were determined as:
- Intercept (β_0): 0.07357
- Coefficient (β_1): 0.55374

The model suggests that for every unit increase in the Net System YoY change from three years ago, the Net Service YoY change is projected to increase by 0.55 units. This model indicates an influence of past Net System sales performance on the current year's Net Service sales trends.

Utilizing this regression model, we projected future Service sales as follows:

Table 9 Service Sales Forecast ($m)

	2023	2024	2025	2026	2027	2028
YoY System change	47%	-16%	17%	37%	3%	18%
YoY Service change	17%	28%	8%	33%	-2%	17%
Net System sales	23,872	29,365	33,526	35,098	44,576	51,143
Net Service & Field Option sales	**7,062**	**9,032**	**9,729**	**12,971**	**12,776**	**14,905**

Adding the sales of Systems and Net Service & Field Option, we have the total sales of ASML and growth rate for the next five years.

Figure 13 ASML's sales projection (in million USD), with growth rate
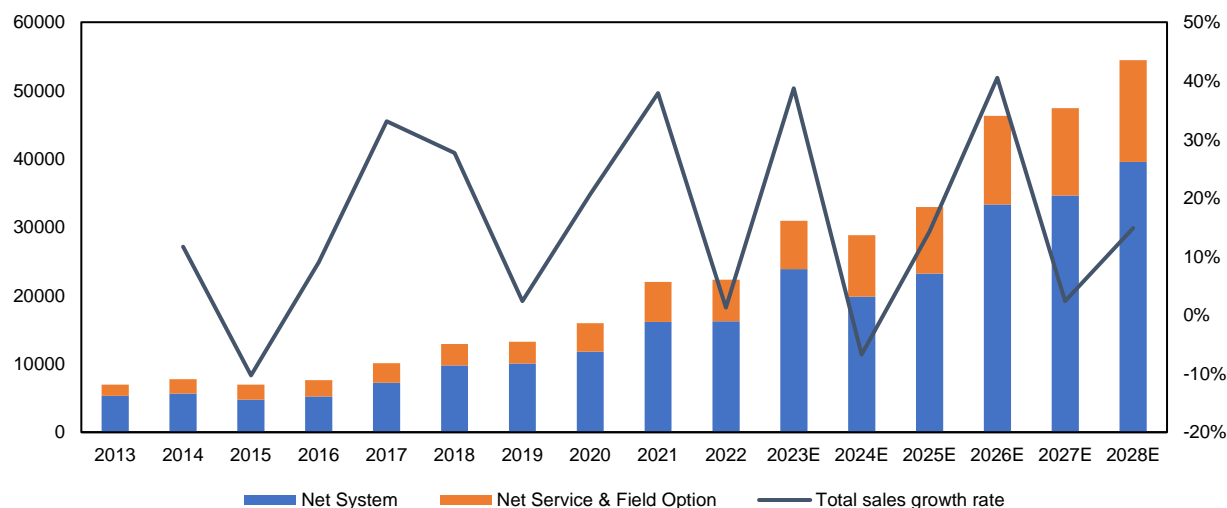
3. Financial Analysis

COGS: We forecast future COGS level based on our total revenue and our assumptions on gross margin. Over the past three years, the gross margin showed a range between 51% to 49%, which is relative stable. In the coming years, we anticipate a gradual decline in the COGS for ASML based on the transitioning preference towards EUV lithography systems over DUV systems. EUV systems, characterized by their advanced capabilities and premium pricing, are poised to yield higher gross margins compared to DUV systems. Therefore, we forecast that COGS will decrease from 49% in 2022 to 47% by 2028.

Figure 14 COGS Forecast
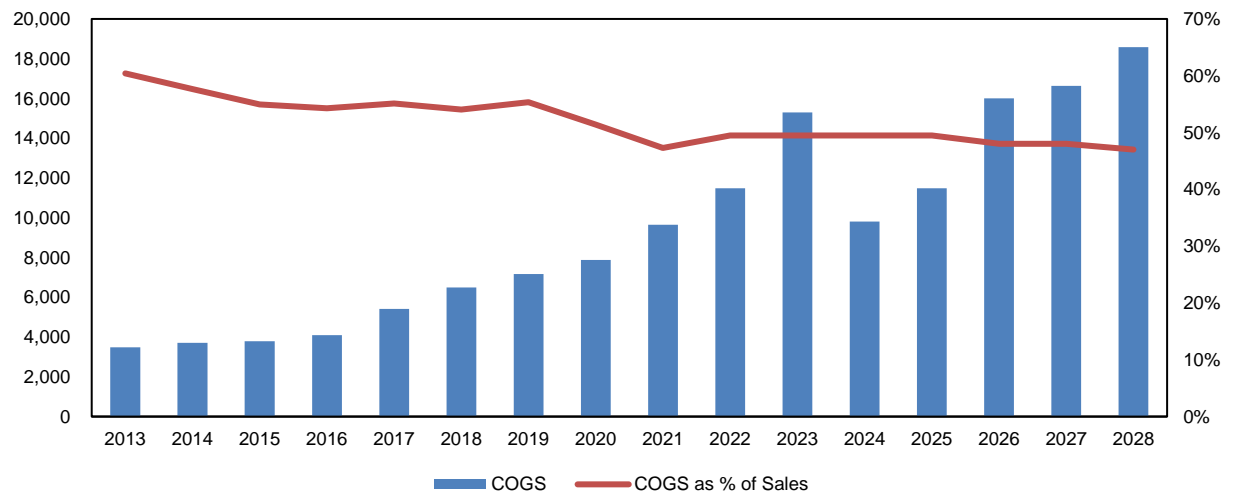
SG&A: Our forecast is grounded in the historical stability observed in these costs. Over the recent years, ASML's SG&A expenses have demonstrated a consistent pattern, maintaining around 4% of the total sales. Based on this trend, it is reasonable to project that SG&A expenses will continue to hover around this percentage in the foreseeable future.

*Figure 15 SG&A Forecast*
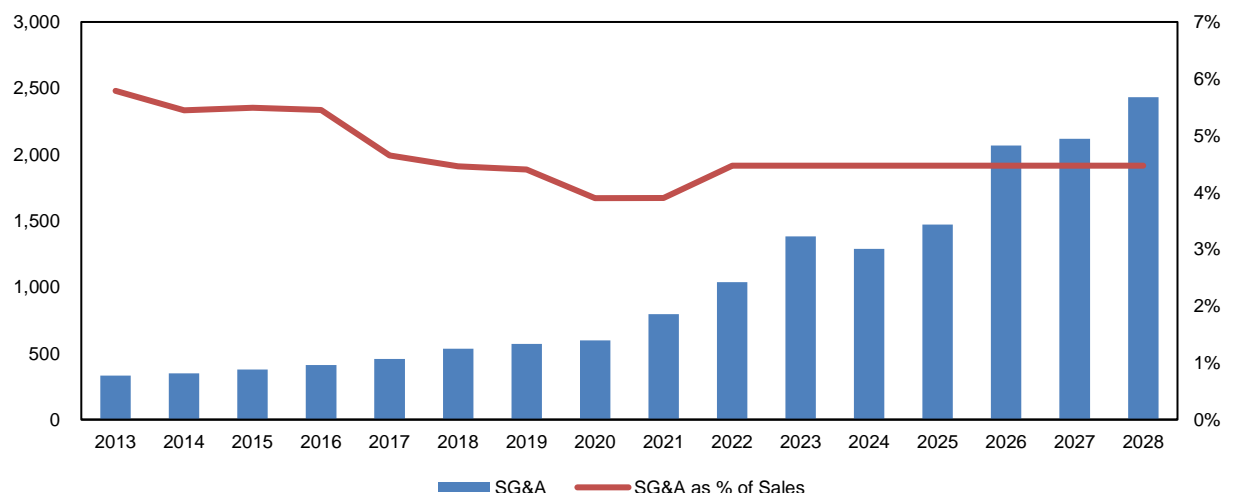
Interest Rate and D/E Ratio:

Historically, ASML has maintained its interest rates within a narrow range of 0.89% to 1.80% over the past decade. However, if ASML were to issue more debt in the future, given the current 10-Year Netherlands Bond Yield rate being 2.52%, the company might have higher cost of debt in the future. We set the interest rate of the next five years to be growing at a constant rate from 1.30% (interest rate of FY2022) to **2.52%** (current 10-year Netherlands bond yield). For ASML, the current YTW is 3.04% (Dec 7th, 2023).

*Figure 16 10-Year Netherlands Government Bond Yield Curve*

Up until 2022, ASML's continuously rising Debt-to-Equity (D/E) ratio could be attributed to the company's expansion efforts. We observed that the company tends to raise its D/E ratio levels approximately every 3-4 years form their historical debt data. This pattern appears to correlate with their preparation for the semiconductor cycle, which, as mentioned in our previous industry report, typically spans around 24-36 months. Based on this observation, we anticipate a similar trend in the company's future debt trajectory.

Figure 17 Historical Debt to Equity Ratio
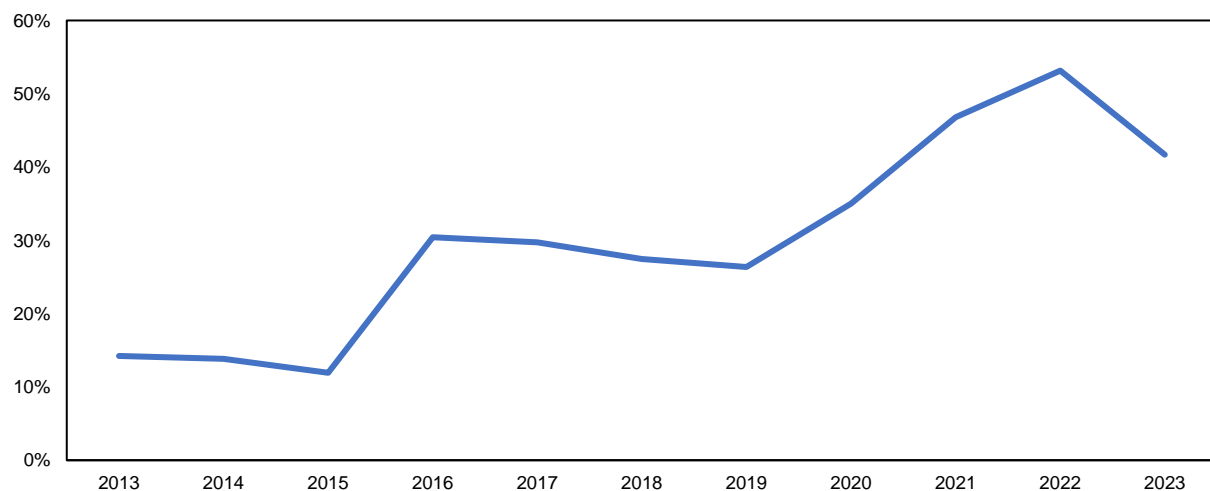
CapEx: According to ASML's Q3 earnings call, the company plans to maintain its current capital expenditure without reduction. Anticipating robust downstream demand in 2025, a year the company foresees as particularly strong, ASML remains prepared. Given the approximate 18-month shipment cycle, the company is poised to sustain a high CapEx rate over the next two years. As a result, we're utilizing a moving average spanning three years to forecast the company's future capital expenditure.

Figure 18 Forecast on CapEx
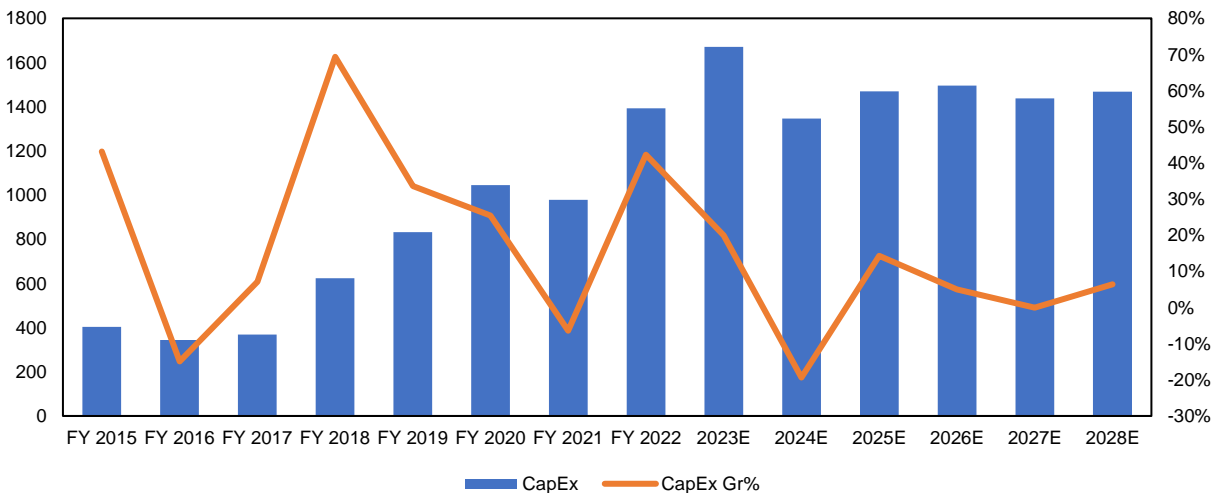
Net Working Capital: The negative working capital experienced in both FY 2021 and FY 2022 primarily stems from high unearned revenue resulting from the challenges faced during the COVID. These challenges were notably driven by material and component shortages that disrupted ASML's supply chain. Additionally, a fire incident within a section of ASML's Berlin factory further compounded the situation in 2021. ASML anticipates a stabilization in working capital in the coming years. To derive forecasts, we are applying a 15% proportion of working capital (historical average ratio) to total revenue, and this also aligns with the company's 100% cash conversion rate target.

Figure 19 Forecast on NWC
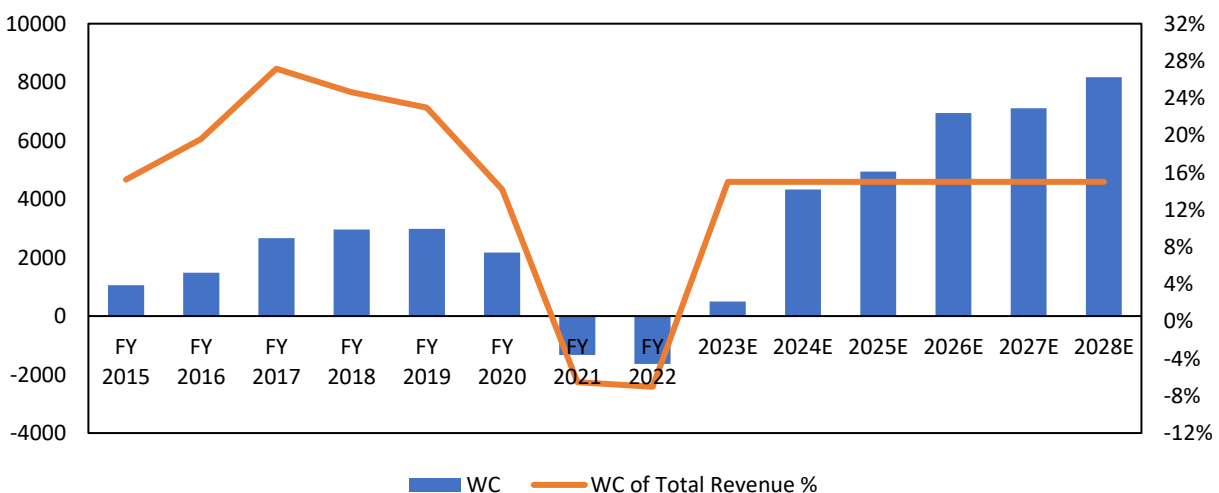
4. Valuation

As we mentioned earlier, we observed notable fluctuations in the D/E ratio. Thus, we used Adjusted Present Value (APV) method for valuation. The APV approach allows for a more accurate valuation in scenarios with significant D/E ratio variations by considering both the unlevered firm value and the value of tax shields from debt separately.

Upon examining the 5-year beta of ASML, we believe the significant drop in ASML's beta around 2008 is associated with the global financial crisis, which led to higher volatility and a reevaluation of risk across the market. Post-2008, ASML's beta has stabilized, suggesting that the company's risk profile has aligned more consistently with market movements. Therefore, we consider it appropriate to use the most recent beta value in our valuation, as it is close to the average of the recent years, indicating a more stable and representative risk measure for the company moving forward.

Figure 20 ASML's Historical Beta

We used the β_E of 1.46. The cost of debt was calculated by the YTW data on FactSet. However, considering the operation and initial issuance place of ASML is in Netherlands, while we are analyzing the stock trading in the US, we apply an interest rate difference to our current cost of debt.

Furthering our analysis, we employed the CAPM model formula, resulting in a cost of equity (r_E) of 11.76%. Using this to calculate the return on assets (r_A), it should be 9.22%. In our valuation, we utilized r_A as the discount rate to compute the present value all equity. Additionally, for the tax shield's present value calculation, we employed the risk-free rate and unlevered beta as discounting factors. The summation of these present values ultimately yields the overall value of the company.

Table 10 Inputs for APV Valuation

Levered Beta β_E	1.461	Derived from chart above
Cost of Debt (r_D)	3.22%	* See calculation process below
Risk-free Rate (r_f)	4.54%	We assume investors based in US
Market Return (r_m)	9.48%	Russell 3000 average annual return
Return on Equity (r_E)	11.76%	
Effective Tax Rate (T_c)	15.00%	
Return on Asset (r_A)	9.25%	
Unlevered Asset Beta β_A	1.079	

* The current cost of debt is calculated based on Dutch government 10-year bond, where we derive a 3.04% YTW. For the U.S. investors, we adjust this cost of debt by this formula to derive an exchange rate factor: $1.08 * (1 + 2.52\%)/(1 + 4.54\%) = 1.059$, where 1.08 is current exchange rate of Euro to USD, 4.54% is the 10-year US T-bill yield, and 2.52% is the current 10-year Netherlands bond yield. Therefore, by multiplying the current YTW 3.04% with the exchange factor 1.059, we could derive the cost of debt for the U.S. investor: $3.04\% * 1.059 = 3.22\%$

Table 11 Present Value Calculation

	2023	2024	2025	2026	2027	2028	Terminal Value
Total Tax Sheild	826	950	950	950	950	1,045	14,412
Discount Factor	1.00	1.05	1.14	1.25	1.36	1.49	1.49
Discounted Tax Sheild	826	909	832	762	697	702	9,676
Total PV(Tax Shield)	**14,404**						
Unlevered FCF	3,521	6,755	11,261	15,124	17,216	19,438	267,996
Discount Factor	1.00	1.09	1.19	1.30	1.42	1.56	1.56
Discounted Equity	3,521	6,182	9,434	11,597	12,083	12,488	172,172
Total PV (FCF)	**227,478**						

Table 12 Valuation Result

PV of All Equity Firm ($m)	227,478
PV of Tax Shield ($m)	14,404
Enterprise Value ($m)	**241,883**
Net Debt ($m)	24
Estimated Market Cap ($m)	**241,859**
Total Shares Out. (m)	394.6
Implied Price per share	612.9
Current price	699.7
Implied Premium	-12.4%

5. Appendix

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	2023E	2024E	2025E	2026E	2027E	2028E
Operating Income	2041	1929	2676	3252	3061	4443	7169	7130	9498	13326	14931	21122	21386	25064
Depreciation & Amort.	264	316	335	343	441	465	417	549	668	539	588	598	575	587
Amort. of Goodwill and Intangibles	124	69	115	113	125	134	53	56	81	63	67	70	67	68
CapEx	-404	-344	-368	-623	-833	-1045	-978	-1392	-1671	-1347	-1470	-1496	-1438	-1468
Change in Net W.C.	-323	427	1191	288	22	-807	-3504	-301	2132	3828	616	2003	167	1054
Unlevered FCF	1225	854	587	1573	1478	3062	7559	3989	3521	6755	11261	15124	17216	19438

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
System Sales	4,379.4	4,653.2	4,727.4	5,175.4	7,045.8	9,058.0	9,866.4	11,314.5	14,973.5	16,922.9	23,872	19,821	23,229	33,338	34,644	39,544
Service Sales	1,373.3	1,769.6	2,168.2	2,364.8	2,783.8	2,944.6	3,097.0	4,016.1	5,437.8	6,298.6	7062	9032	9729	12971	12776	14905
Total Sales	5,752.7	6,422.8	6,895.6	7,540.1	9,829.7	12,002.6	12,963.4	15,330.7	20,411.3	23,221.5	30,934.7	28,852.8	32,958.2	46,308.3	47,419.5	54,448.8
Growth Rate		12%	7%	9%	30%	22%	8%	18%	33%	14%	33%	-7%	14%	41%	2%	15%
COGS	3,475.4	3,701.9	3,788.4	4,090.6	5,420.6	6,486.9	7,172.8	7,876.0	9,653.4	11,486.4	15,301.65	9804.146328	11490.18294	16002.14551	16628.98069	18585.48838
COGS as % of Sales	60%	58%	55%	54%	55%	54%	55%	51%	47%	49%	49%	49%	49%	48%	48%	47%
SG&A	332.9	349.5	378.7	411.1	456.9	535.2	570.8	597.6	795.8	1,037.4	1,381.98	1,288.97	1,472.38	2,068.78	2,118.42	2,432.45
SG&A as % of Sales	6%	5%	5%	5%	5%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
R&D	608.1	789.0	778.9	1,212.8	1,381.6	1,728.3	2,158.9	2,413.7	2,793.4	3,568.2	4,753.39	4,433.50	5,064.33	7,115.70	7,286.44	8,366.55
R&D as % of Sales	11%	12%	11%	16%	14%	14%	17%	16%	14%	15%	15%	15%	15%	15%	15%	15%
Operating Income	1,407.04	1,671.15	2,040.75	1,928.55	2,675.68	3,252.18	3,060.82	4,443.40	7,168.64	7,129.54	9,497.64	13,326.20	14,931.32	21,121.72	21,385.69	25,064.31
Total Debt	1,177.6	1,269.7	1,241.9	3,680.4	3,512.2	3,507.9	3,638.6	5,324.1	5,204.9	5,137.0	5,486.6	6,309.61	6,309.61	6,309.61	6,309.61	6,940.57
Net Debt	(2,150.7)	(1,780.0)	(2,536.6)	(802.4)	(125.4)	(948.3)	(1,570.2)	(2,778.8)	(3,159.8)	(2,954.4)	23.9					
Total Debt/Equity	14.2%	13.8%	11.9%	30.4%	29.7%	27.5%	26.3%	35.0%	46.8%	53.2%	41.7%					
Interest Expenses	-19.9	-12.6	-17.1	-41.7	-63.1	-45.8	-40.1	-47.5	-59.9	-66.7	(83.14)	(109.30)	(122.99)	(136.68)	(150.36)	(180.45)
Interest Rate	1.69%	0.99%	1.38%	1.13%	1.80%	1.31%	1.10%	0.89%	1.15%	1.30%	1.52%	1.73%	1.95%	2.17%	2.38%	2.60%
EBT	1,387.14	1,658.55	2,023.65	1,886.85	2,612.58	3,206.38	3,020.72	4,395.90	7,108.74	7,062.84	9,414.50	13,216.90	14,808.34	20,985.04	21,235.33	24,883.85
Income Tax Expense	68.51	118.50	259.49	257.07	335.60	385.61	210.24	604.85	1,120.20	1,063.72	1,417.90	1,990.57	2,230.25	3,160.52	3,198.21	3,747.71
Tax Rate %	5%	7%	13%	14%	13%	12%	7%	14%	16%	15%	15%	15%	15%	15%	15%	15%
Total Tax Shield	58.16	90.72	159.25	501.44	451.16	421.87	253.25	732.56	820.19	773.67	826.33	950.28	950.28	950.28	950.28	1,045.31
Net Income	1,319	1,540	1,764	1,630	2,277	2,821	2,810	3,791	5,989	5,999	7,997	11,226	12,578	17,825	18,037	21,136