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Equity Research Report ASML Holding NV - Shaping
everyone's digital future

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Abstract

ASML is the world's leading provider of lithography systems for the semiconductor industry, manufacturing complex machines that are critical to the production of integrated circuits or chips. The key objective is to analyse the complex nature of the business of ASML NV and evaluate a share price goal for FY2023. To examine the company, annual statements from 2018 to 2021 are exploited. We provide an overview of ASML's landscape and insights into the financial statements. The report includes a discussion of ASML's business model, product portfolio, and competitive advantage. The program used to analyse the data is Excel.

Moreover, the semiconductor, as well as the lithograph industry, and a possible impact of macroeconomic factors regarding the valuation, market trends and dynamics, are discussed. Semiconductors are becoming an increasingly essential factor in the world's economy, especially to justify and explain the digital transformation and the overall development of countries and its population. Overall, ASML is well-positioned to continue its strong performance, while stressing the importance and implication of such market power regarding lithography.

Semiconductor Equipment – European Technology Hardware – Lithography - EUV

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This report is part of the ASML Equity Research report (annexed), developed by Klaus Wenger-Oehn (51019) and Sebastian Fenz (48744) and should be read as an integral part of it.

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Introduction

Thus far, ASML has remained a broadly discussed and extensively researched company in the equity market. It is particularly interesting for both equity researchers who test its market standing and market participants who hope to build a strong investment case by trying to forecast ASML's future development. ASML is a market leader in the lithography equipment market and has a significant competitive advantage over its rivals. The company has a strong financial position, with a robust balance sheet and healthy cash flows. ASML has a history of strong profitability, and its shares have outperformed the broader market indices over the long run.

The report is structured in four parts, with the first being an introduction into the company and its business as well as its strategy. The second part gives the reader an understanding about the macroeconomic context and possible risks and drivers regarding ASML's industry and an overview of the competitive landscape. The third part is structured in our forecast assumptions and the reasoning behind these assumptions. The final part is the valuation, which gives us our target share price at the end and helps us understand the standing among its peers. We believe that ASML will benefit from the strong demand for semiconductor chips, and its leading market position gives it a good platform to continue to grow its business.

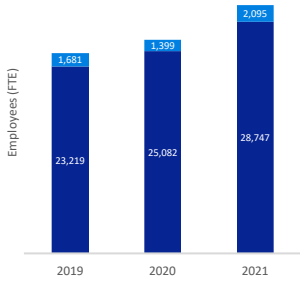
In this individual report, the company overview along with its stock performance is further broken down. Moreover, macroeconomics implications and assumptions regarding its costs as well as ASML's capital structure will be analysed. To conclude this report, part of the valuation outcome will be described. The pair will cover the competitive landscape, as well as some of the valuation assumptions, and will conclude with a valuation outcome.

Market leaders in the Lithography equipment industry

Company Overview

To develop lithography technologies for the expanding semiconductor market, electronics powerhouse Philips and chip-machine manufacturer Advanced Semiconductor Materials International (ASMI) founded a new firm in 1984, called ASM Lithography. During the 1980s ASMI opted to withdraw after finding it difficult to maintain high levels of investment with minimal return. ASML went public in 1996 and was listed on the Amsterdam and New York stock exchanges, gaining complete independence. The IPO provided funding to further extend their R&D and production facilities. At the IPO, Philips sold half of its shares, with the remaining shares being sold off over the ensuing years. As of 2021 ASML operates 60 locations and employs 30.842 workers. Due to the growth in the past years, ASML's workforce has more than doubled in the past five years and is expected to grow further. (ASML 2021)

Graph 1: Workforce development



■ Payroll employees (FTE) ■ Temporary employees (FTE)

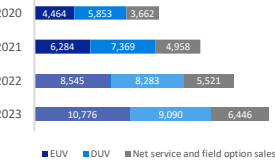
Source: ASML Annual Statement

ASML's products and services are split across four business segments, all of which highly grew over the last years:

Business Line EUV

Extreme Ultraviolet (EUV) will be one of ASML's key products going into the future, by offering lithography resolution enhancement, revolutionary overlay performance, and cost reduction. ASML EUV lithography extends their Logic and DRAM customers' roadmap. Their clients are utilizing EUV in the logic node and started utilizing EUV in the DRAM node in 2021. The EUV product roadmap anticipates expanding ASML's EUV platform and launching an EUV 0.55 NA platform by 2025. Two of the key factors to ensure success and to meet the rise in demand will be ensuring high productivity levels as well as high output of machines. By 2025 EUV will make up about 70% of ASML's business. It is expected that ASML will release a new tool every two years, which would be in line with the continuation of Moore's Law. Moore's Law, a forecast made more than 50 years ago, still governs the speed of innovation in the semiconductor sector. According to Gordon Moore, computing will become exponentially more powerful while also becoming more affordable. In other words, an integrated circuit will have twice as many transistors every two to three years at the same cost level. This opens two possibilities for increasing the speed and power of chips: either utilizing the same number of transistors on a chip at half the cost or using twice as many transistors at the same price level. The strength of this forecast still serves as the cornerstone of the semiconductor industry and its development. (ASML 2021)

Graph 2: Revenue split (€m)

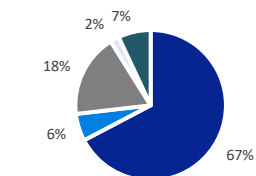


Source: ASML Annual Statement

Business Line DUV

Demand for Deep Ultraviolet (DUV) is at an all-time high and it is anticipated to stay high for the coming years due to growth in both the advanced and mature markets, which leads to a continued call for both immersion and dry systems across all wavelengths. This is paired with an increased focus on optimizing the installed base with value-added services like upgrades concerning productivity and performance. In 2021 DUV accounted for 37% of ASML's sales. Maintaining their DUV competitiveness in innovation will help customers

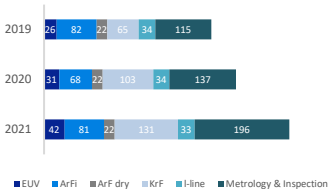
Graph 3: DUV Segmentation



• ArFi • ArF dry • KrF • I-line • Metrology & Inspection

Source: ASML Annual Statement

Graph 4: No. of Units sold



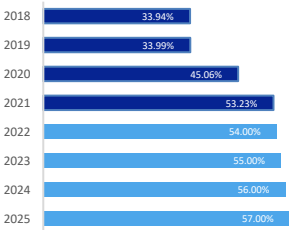
Source: ASML Annual Statement

execute their roadmaps by pushing DUV to the limit. This includes increasing the number of installed systems and meeting client expectations by continuously enhancing operations.

Business Line Applications

ASML's applications business is in support of the scanner business, and it provides the optical and e-beam metrology, multi-beam inspection, the control algorithm, the scanner application software, and the interface to the machine. This helps customers control and maximize their patterning performance. The primary drivers of the application business line will be the extension of the edge placement error roadmap, which is the difference between the intended and the printed features since it is the best predictor of yield. The business line focuses its strategy on nanometres, which means more accuracy and a fast time to yield by having higher productivity metrology and alignment.

Graph 5: Installed based Profitability ASML

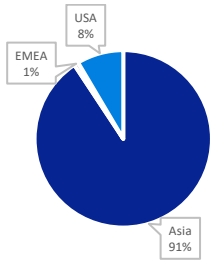


Source: ASML Annual Statement, Analyst estimates

Installed Base Service

The Installed base Service has contributed to more than 25% of total revenue in FY21 and has a margin of about 53%. It covers the servicing to provide high availability and minimal long-term downs as well as the upgrading of existing machines to provide a better system output and extend its lifetime. Within this segment, ASML offers availability improvements, software upgrades, and reactive as well as proactive diagnostics. The goal is to provide the lowest possible service cost per wafer and maximize good wafers per day. This is highly important for their customers since fabs are designed with lithography as the constraint.

Graph 6: Geographic Split



Source: ASML Annual Statement

Geographics

ASML has a significant global presence with the majority of revenues driven by the Asian Market with South Korea (33,4%), Taiwan (39,4%), and the United States (8,5%). Its factory hubs are located in Wilton and San Diego (US), Linkou (Taiwan) as well as Veldhoven (the Netherlands). The Netherlands, where the Group is incorporated, contributes to 0,08% of the total revenue.

Table 1: Biggest Shareholder

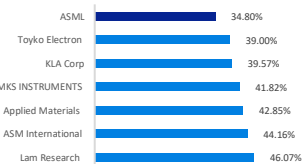
	Nr. Shares	% of class
Capital Research and Management Company	63.658.826	15,81%
BlackRock Inc.	32.024.422	7,95%
Baillie Gifford & Co	18.262.995	4,54%

Source: ASML Annual Statement, Bloomberg

Ownership Structure

ASML Holding N.V. is traded on Euronext Amsterdam under the ticker "ASML.AS" and on the NASDAQ under the ticker "ASML" and has a market capitalization of € 224.170.574.244 as of November 11th, 2022, represented by 406.474.296 shares of which 44% are held by institutional investors. Moreover, ASML's institutional and strategic shareholders are mainly from North America with 48%, and EMEA with 40%. Currently, Members of ASML's current Board of Management, hold approximately 0,02% of the total shares. The high percentage of institutional and strategic investors implies a low turnover and therefore adds to less volatility in the share price. As seen in Graph 6, ASML has the lowest annualized volatility amongst its peers using 5y weekly data. This should positively

Graph 7: Annualized Volatility



Source: ASML Annual Statement, Bloomberg

encourage the Board of Management to concentrate on generating long-term growth and returns.

Board of Management

Table 2: Board of Management

Name	Position
Peter T.F.M. Wennink	President, CEO and Chair
Martin A. van den Brink	President, CTO and Vice Chair
Roger J.M. Dassen	Executive Vice President and CFO
Christophe D. Fouquet	Executive Vice President EUV
Frédéric J.M. Schneider	Executive Vice President and COO

Source: ASML Annual Statement

Peter T.F.M. Wennink is Chief Executive Officer and Chair of the Board of Management since 2013. Wennink jointly with Martin A. van den Brink, who is the Chief Technology Officer act as Presidents and compose with 3 other members the Board of Management of ASML. On the 19th of October 2022, ASML announced an expansion of the Board of Management from five to six members. From April 2023 onwards Wayne Allan will act as Chief Strategic Sourcing & Procurement Officer. A stable board will give ASML effective leadership and direction for their future business development, enabling it to run smoothly and effectively. We place credibility on their leadership, given their successful history in the company, which will help ensure that the business follows good governance principles and complies with applicable rules and regulations, which can enhance its stability going forward.

ASML's Strategy

ASML is constantly investing in research with a focus on developing new products and bringing new services to market. The company has a strong focus on customer satisfaction and providing value-added services and is centred on long-term relationships and close cooperation with suppliers, partners, and customers. Their future success will depend on their ability to quickly respond to further technological developments in the semiconductor equipment space.

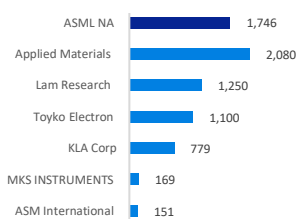
Technology & Innovation

Scaling semiconductor systems allows for exponential performance and energy improvement in support of a considerable increase in data exchange, this is closely tied to ASML's and their customer's roadmap. In comparison to sophisticated multi-patterning procedures, the switch from Deep Ultraviolet (DUV) to Extreme Ultraviolet (EUV) light has revolutionized chip manufacturing and lowered costs across the board. ASML is one of the pioneers in the EUV space and by fostering trustworthy connections with clients and offering more robust, comprehensive products, ASML continues to protect this strategy and will further establish their market dominance. The success of their EUV 0,55 NA (High NA) technology will be crucial for continuing the speed of advancement and being in line with Moore's Law. The High NA EUV platform tries to maximize compatibility with the Low-NA EUV platform to lower technical introduction risk and R&D expenses. Additionally, as innovation delivery costs increase, more R&D funding is needed to accomplish the same objectives to get new products to customers early.

Acquisitions

ASML's technological dominance is a result of deliberate partnerships that enable advancements for their customers that are affordable and despite having a significant

Graph 8: R&D Expenditure FY21 (€m)



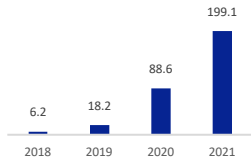
Source: ASML Annual Statement, Bloomberg

Table 3: M&A Activities

Year	Acquisition Details
2001	Silicon Valley Group for € 1.8bn
2007	BRION für €203m
2013	Cymer for €3.1bn
2016	Hermes Microvision (HMI) for €2.8bn
2017	Carl Zeiss SMT Holding acquisition 24.9% interest for €1bn
2020	Berliner Glas acquisition for €0.3bn

Source: ASML Annual Statement, Bloomberg

Graph 9: Profits from Carl Zeiss Investment (€m)



Source: ASML Annual Statement, Bloomberg

international footprint, ASML has invested internationally by acquiring companies across their supply chain to enhance synergies in their offering. ASML’s strategy is anticipated to include strategic M&A activities and joint ventures, concentrating on developing technologies. Therefore, ASML made the 24.9% investment in Carl Zeiss to jointly fund R&D activities and subsequently drive the development of EUV in order to advance the creation of new lenses. This is a strategy that we expect to be continued in the future.

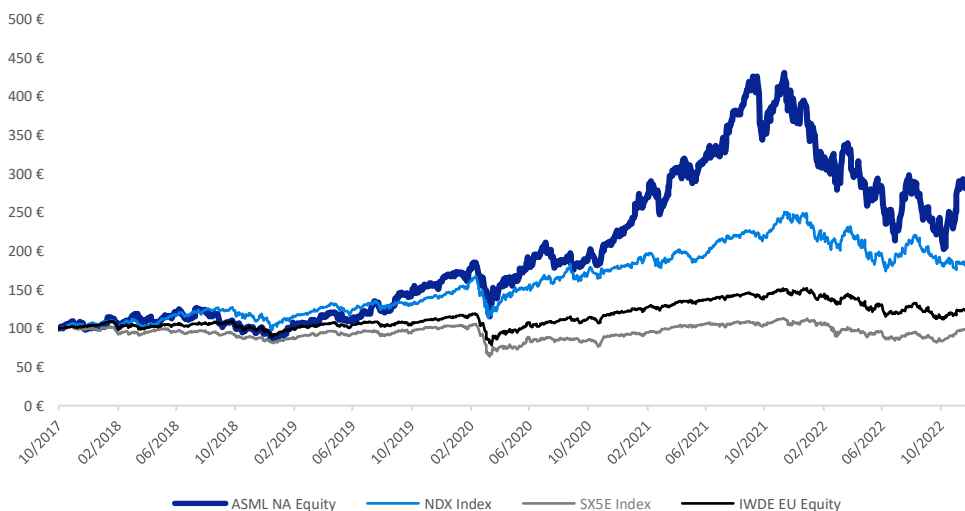
- Capacity Expansion

During their recent Investor Day, ASML announced their expectation that the industry and the ASML ecosystem are expected to double in size by 2030. To prepare for strong long-term growth, they are planning to invest timely and sustainably in additional capacity, with a strong emphasis on the objective of meeting all customer needs during fluctuations and incorporating flexibility to expand quickly and adapt in downturns, which is also supporting its expansion plan of 90 EUV Systems by the years 2025/2026. ASML also plans to reach an annual capacity for High NA EUV at 20 systems by 2027/2028.

Stock Performance

Currently, the stock is part of the European EURO STOXX 50 Index, representing the 50 largest publicly traded companies in the Euro area, and has the highest weight in the index. In addition, the Group is included in the NASDAQ-100 index, reflecting the 100 companies of the Nasdaq Composite with the highest market capitalization. Comparing ASML’s historic stock performance to the EURO STOXX 50 and the NASDAQ over the past five years, we find that ASML overall outperformed the market. We believe that ASML has consistently outperformed these indexes due to the electronics- and therefore the semiconductor boom that has been leading to results that exceed investors’ expectations.

Graph 10: ASML vs. Indices

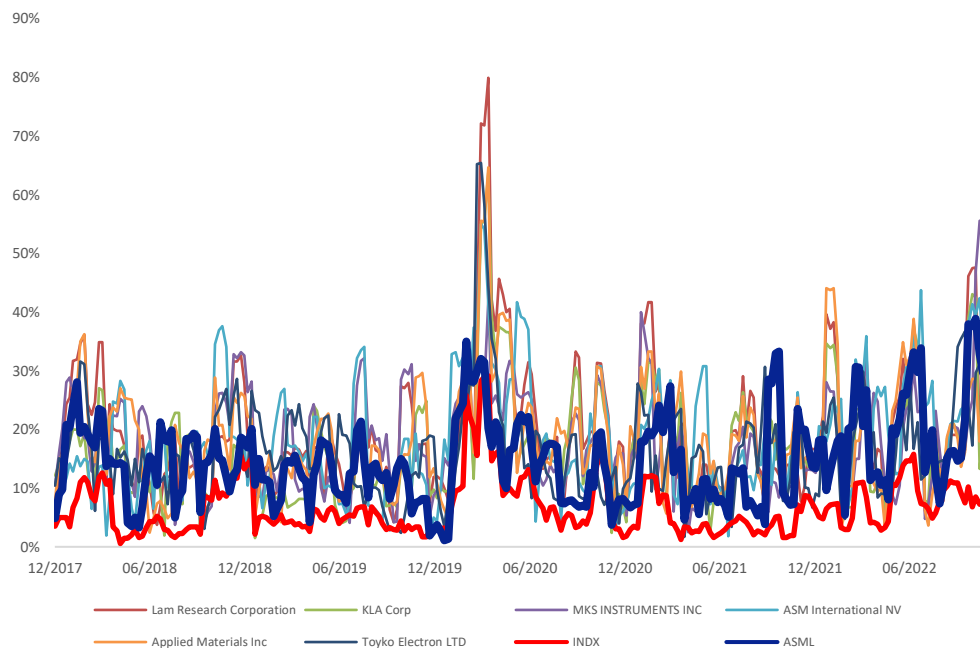


Source: Bloomberg

Looking at the rolling annualized volatility of ASML against its peers (Graph 11), we can

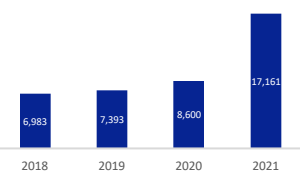
see that ASML has the lowest, which indicates that the stock is less subject to sudden changes and therefore reduces the risk associated with it.

Graph 11: Rolling annualized volatility ASML vs. Peers & Index



Source: Bloomberg

Graph 12: Cumulative share buybacks (€m)



Source: ASML Annual Statement

Since November 2022, ASML's Board of Management has authorized a new share buyback program of up to €12bn to be executed by 31. December 2025. This replaces the previous share buyback program of €9bn from 2021-2023. In 2021, ASML has repurchased 14.358.838 shares for a total of €8.560,3 million, of which 6,601,699 shares were acquired under the new program for €4.560,3 million. Also, ASML paid a total dividend of €5.50 per ordinary share in FY21. Through these share repurchasing programs ASML artificially inflates its earnings per share, rather than investing in internal growth. Given the low- interest rate environment, it makes sense to return funds to its shareholders rather than invest them in securities.

Table 4: Dividend payouts

	2018	2019	2020	2021
Dividend per share (in €)	2,10	2,40	2,75	5,50
Number of shares outstanding (in million)	425	421	418	410
Total dividends paid (in million €)	517	1.326	1.066	1.368
Net income available to shareholder (in million €)	2.526	2.581	3.697	6.135
Dividend payout ratio	0,20	0,51	0,29	0,22

Source: ASML Annual Statement

Macroeconomic Context and Challenges

Global electronics industry megatrends are anticipated to continue to drive expansion across the semiconductor market, supported by a highly profitable and innovative ecosystem. This will lead to an increase in wafer demand at both advanced and mature nodes, but as chip characteristics continue to get smaller, the industry requires the

appropriate equipment to develop chip technology in large quantities at a reasonable price. Since the semiconductor industry is closely tied to the health of the broader economy, we must look at its possible implications for ASML.

Global Trade Wars

Due to U.S. diplomatic pressure, ASML has been prohibited by the Dutch government from shipping its most advanced EUV machines to China since 2019. The sale of semiconductors to China is now subject to broad new limitations put in place by the U.S. administration earlier this year. Given that ASML is a European company with few U.S. parts utilized in its machines, it said that the impact of the new U.S. restrictions appears to be minimal. ASML still sells its older DUV technology to China, which make up 15% of its total sales in 2021. This provides ASML an advantage over its American competitors, as U.S. lithography equipment manufacturers could lose about 15-20% of their annual sales. (Lam Research Corporation 2022) (Applied Materials 2022) It is important to remember that moderate escalation of US sanctions against China is likely to be good for ASML as there are high Barriers to entry, if they do not respond aggressively. ASML warned Chinese clients about having trouble finding additional parts. It is expected to remain unchanged as this is linked to technological trade policies because of efforts to increase the U.S. chip industry's independence. Since China still lacks access to EUV technology and if this were to change, we would experience higher growth rates, particularly for EUV and High NA EUV business lines.

Recession Fear

Inflation and declining consumer confidence together produce uncertainty, particularly on a macroeconomic level. In such an environment, recession risk is evidently present. This could potentially lead to customers running lower utilization rates on their existing machines, reduced CAPEX spending of customers, and requests for delays of new machines. Due to the significant down payments that consumers commit to ASML, order cancellations are unlikely. Additionally, ASML's customers want to transition to EUV as soon as possible, which will benefit ASML's standing regarding the uncertainty in the market. Therefore, we assume a minor risk in the very short-term future regarding the lithography end market, however, we think that the expected probability of it materializing in the mid- and long-term is low, thus ignoring the risk.

In addition, discussions of "technology sovereignty" may encourage the expansion of fabrication facilities in the United States and Europe in addition to Asia, as they are focusing on assuring an adequate supply of semiconductors to sustain their regional industries. This would be advantageous for the fab equipment business and ASML, as it will lift the demand for lithography equipment. Tech sovereignty will be a major upside for the coming years and beyond and is expected to amount to over \$150bn of the industry's CAPEX. Flexibility about being able to adapt quickly will be a key factor in the success going forward.

Table 5: CAPEX spending

	Programm	Capex spend
USA	Chips Act, Fabs Act	\$52bn + Investment tax credits
EU	European Chips Act	\$46bn
China	Integrated Circuit Industry Investment Fund ("Big Fund")	\$20,7bn Phase 1 + \$30,5bn Phase 2 + Tax breaks
Taiwan	Invest Taiwan Initiative	Tax credits + help securing land, water and electricity
South Korea	K-Semiconductor Belt	Tax credits + aim to attract \$450bn in private investments by 2030
Japan	Specified ICT Utilization	\$4,42bn + subsidies für setup costs

Source: „The resilience myth: Fatal flaws in the push to secure chip supply chains“, Nikkei Asia, July 26, 2022

Shortages

The semiconductor industry is already facing a shortage of skilled labour, and this is expected to worsen as the demand for semiconductors increases. This will lead to a global race for talent and finding and retaining qualified talents will become more important than ever. This due to the lack of sufficient scientists, engineers, or software developers that have the expertise to create novel solutions.

Moreover, ASML's customers are also facing a shortage of raw materials, which is expected to impact production, and if resources become scarce, it will put even more pressure on the chip manufacturers. Since there is a growing demand throughout the entire product line due to the continuous digital transformation, ASML will need to address this issue across the entire supply chain and should account for potential delays in the assembly of new machines, should circumstances deteriorate. The production of an EUV machine requires about 100.000 different parts from 4.700 suppliers, of which 200 are critical. This is important to understand since it could have serious implications for ASML. However, ASML mitigates this risk, by conducting an annual risk assessment for critical suppliers to reinforce a robust supply chain.

Currencies risks

Although ASML reports all their results in Euros, most of their revenues were earned in US Dollar and a small portion in Japanese yen, Taiwanese dollar, Korean won, or Chinese Yuan. Even though they invest in hedges against currency risk with derivatives instruments, they are still subject to unexpected changes in exchange rates. Even though currency risk has previously manifested, we do not consider it significant for our valuation since currency exchange rates are incredibly difficult to forecast. We believe that in the long run unexpected changes tend to balance out.

Table 6: ASML's cost structure (€m)

	2020A	2021E	2022F
COGS System Sales	4.863	6.187	7.572
In % of Revenue	34,79%	33,24%	33,88%
COGS Service & Field Option	2.012	2.319	2.540
In % of Revenue	14,39%	12,46%	11,52%
(R&D)	1.448	1.746	2.463
In % of Revenue	10,36%	9,38%	11,02%
(SG&A)	509	683	824
In % of Revenue	3,64%	3,67%	3,69%

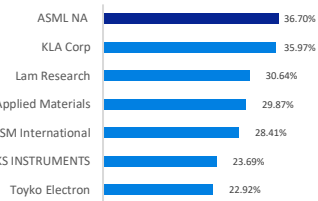
Source: ASML Annual Statement, Analyst estimates

Valuation

Costs / Operating Margins

We believe that despite the higher cost inflation, ASML will be able to renegotiate its selling prices to further drive its gross margin goal of 54-56% by 2025, since ASML's customers are dependent on the new EUV technology as well as upgrades of their existing machines. However, we think that a lower range of 53-55% will be more suitable

Graph 13: EBIT margin FY21



Source: ASML Annual Statement, Bloomberg

considering the economic uncertainty regarding resources and due to the cost transfer to customers. Going forward we believe ASML will be able to keep up its margins associated with efficiency gains and automation within its production facilities. In the long run, increased value addition would result in larger gross profit margins, particularly for High NA EUV and EUV.

ASML can achieve an EBIT margin of 36,70%, which is the highest EBIT margin among its peers. This is due to increased EUV profitability as a result of providing greater value to their customers and increased profitability in their installed base business as a result of ramping up production and adding additional efficiency upgrades. ASML also benefits from a large economy of scale as well as their market standing, especially within their EUV business line.

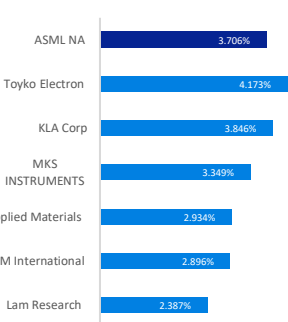
Capital Expenditures (“CAPEX”)

The nature of the semiconductor industry is highly capital intensive, this is also the case for ASML and to develop next-generation technologies to further secure growth opportunities, significant cash investments in capital expenditures are required. Nearly all ASML’s capital expenses are covered by their liquid assets.

From 2018 to 2021 property, plant, and equipment (PP&E) increased by approximately €1,4bn resulting in a PP&E position of about €3,0bn. ASML intends to further develop their EUV technology, especially as they are trying to launch their next generation of EUV technology called EUV 0.55 NA (High NA). To achieve that they recently completed their new EUV 0.55 NA factory and logistics facility. We believe that from 2022 onwards, their PP&E growth will be in line with their EUV growth.

To further promote growth and advancement, as mentioned in the strategy section, ASML will continue to invest in leading companies with unique technologies to advance their technological leadership and enable cost-effective innovations for their customers. This is incorporated into the development of intangible assets and will eventually lead to increased sales. Therefore, it makes sense to keep making investments in intangible assets, which will help to improve future cash flows. We decided on the rationale, that intangible assets represent a percentage of sales, and this relationship will be maintained in the future.

Graph 14: CAPEX/ Revenue FY21

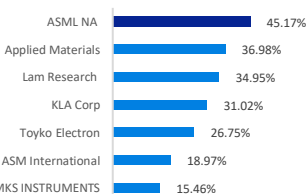


Source: ASML Annual Statement, Analyst estimates, Bloomberg

Return on Invested Capital

The ROIC is stabilizing at 54,4% throughout the remaining three years of the forecasting period, which is in accordance with the idea of reaching at a stable state. In comparison to the semiconductor equipment peers, the ROIC is higher the average of 37,24%. (Damodaran 2022) This is due to the unique market standing and company composition. Looking at the development of the ROIC, ASML will keep creating additional value to its shareholder in the future.

Graph 15: Return on Invested Capital FY21



Source: ASML Annual Statement, Analyst estimates, Bloomberg

Weighted Average Cost of Capital

Table 7: WACC Metrics

WACC Metrics	
Debt	
Probability of Default	0,20%
Loss given Default	51,00%
Yield to Maturity	3,12%
Credit Rating	A3
	3,02%
	2,56%
Equity	
Risk Free Rate	2,65%
Market Risk Premium	5,53%
Unlevered Beta	1,30
Cost of Equity	8,15%

Source: ASML Annual Statement, Analyst estimates

Table 8: BETA ASML vs. Peers

	5y Monthly BETA
Lam Research	1,47
KLA Corp	1,43
MKS INSTRUMENTS	1,64
ASM International	1,59
Applied Materials	1,65
Toyko Electron	1,43
ASML	1,30

Source: ASML Annual Statement, Analyst estimates

Assuming an actual tax rate of 15,2%, the after-tax cost of debt, and the cost of equity we computed a WACC of 7,97%.

▪ Cost of Equity

We therefore utilize the MSCI World Euro denoted as a market proxy, reflecting the global scope of ASML's revenues and their global investor base, as well as the fact that ASML publishes in Euro. To avoid the effects of daily volatilities we have seen in the past years, we use the monthly returns of the past 5 years. To compute the levered beta, we regress ASML's stock return with the market proxy. In addition, we also look at unlevered betas from comparable companies, to see if they are line in with the beta from ASML and to further improve the beta estimation. Therefore, we regress them with their respective currency-denoted market portfolio. However, due to the absence of true peers, no adjustments are made. As mentioned before, ASML is less volatile than its semiconductor peers, which implicates a strategically positioned business in the growing semiconductor sector with a solid long-term strategy.

To arrive at the cost of equity we use the CAPM model. For the risk-free rate, the last rate of the Netherlands 10-Year Government Bond (TBMKKNL-10Y) is used, since ASML is incorporated in the Netherlands. We applied this logic for the market risk premium as well and therefore assume the market risk premium for the Netherlands, derived from Damodaran's report. (Damodaran 2022)

▪ Cost of Debt

In order to calculate ASML's expected cost of debt, we consider one of their 10y bonds with a yield to maturity of 3,09% and an S&P A- rating. Based on Moody's default study, where we assume a loss given of senior unsecured bonds of 51% and a probability of default of 0,20%. We believe based on the financial situation, ASML's cash and equivalents strategy, and its strong share buyback program, that Moody's estimates are appropriate. This leads us to a cost of debt after tax of 2,56%.

Valuation Outcome

Relative Valuation

Table 9: Multiples ASML vs. Peers

Semiconductor Peers	EV/EBIT	Price/Sales
Lam Research	19,89x	4,92x
KLA Corp	20,46x	8,81x
MKS INSTRUMENTS	14,34x	2,02x
ASM International	37,46x	7,43x
Applied Materials	18,34x	4,43x
Toyko Electron	20,67x	4,34x
Median	20,17x	4,68x
DUV Peers	EV/EBIT	Price/Sales
Canon Inc	10,79x	1,10x
Nikon Corp	-	0,96x
Median	10,79x	1,03x

Source: ASML Annual Statement, Analyst estimates

ASML specializes in the development and manufacturing of lithography systems for the semiconductor market, however, there are no comparable companies that accurately represent ASML's business model. To still find suitable peers, we analysed peer large-cap semiconductor equipment companies, capturing the growth potential of the semiconductor market. Firstly, we identified companies within this industry, facing similar risks associated with macroeconomics and positioned in a similar market segment. Conglomerates with comparable fab equipment endeavours were also taken into consideration, which included market dynamics into the valuation. When deciding and analysing what multiples to use, we found the price-to-earnings ratio (P/E) and enterprise

value to EBIT (EV/EBIT) to be the most appropriate. Although ASML is one of the only companies that is based in Europe, comparing it with Lam Research Corporation, KLA Corp, MKS Instruments, Applied Materials Inc, and ASM International NV as well as Canon Inc. and Nikon Corp. does capture ASML's global scale the best.

When looking at the EV/EBIT ratio we reached a range from 14,34x to 37,46x, which corresponds to a share price range of €245,81 - €634,39, according to the P/Sales ratio, ASML would have a share price range of €92,45 - €403,61 This concludes when using the Median share prices of €214,17 for P/Sales and €343,89 for EV/EBIT, which are values below ASML's share price. This confirms that ASML does have a big premium over its peers. Reasons for that could be that ASML does have a unique standing and position in the lithography market. None of its peers are close to ASML's market share. Other reasons could be the quality of the firm on a global scale so that international investors are willing to pay premiums as well as the unique standing as a driver for high-quality technology stocks in Europe. This presents the complexity of ASML's market, since just looking at comparables may not completely illustrate the company's value and may lead us to undervalue ASML.

Sensitivity Analysis

Table 16: Sensitivity Analysis

		WACC		
		7,76%	7,96%	8,16%
EV	2,79%	246.342	236.712	227.791
	2,99%	253.485	243.216	233.731
	3,19%	261.241	250.254	240.139

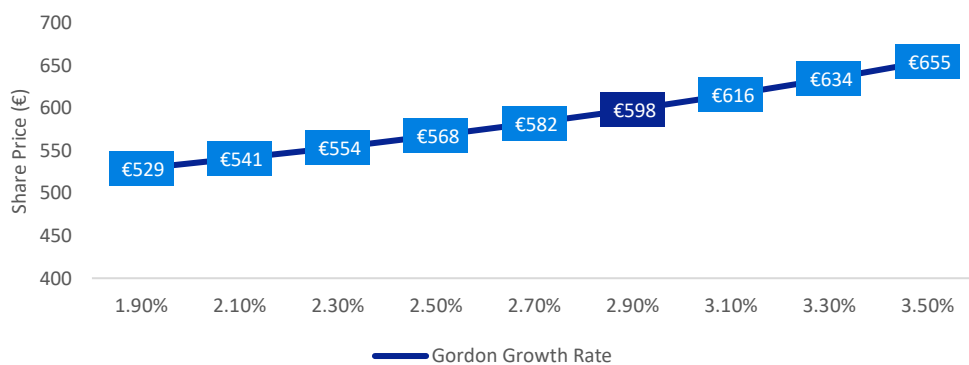
		WACC		
		7,76%	7,96%	8,16%
Share Price	2,79%	608,0 €	583,6 €	561,1 €
	2,99%	626,2 €	600,2 €	576,2 €
	3,19%	646,0 €	618,1 €	592,5 €

Source: Analyst estimates

Considering the deviation of WACC and the terminal growth rate a sensitivity analysis was carried out to reflect the range of ASML's expected enterprise value and share price. The Weighted Average Cost of Capital ranges from 7,76% to 8,16% with 0,2% steps. For the growth rate the same step size was applied, ranging from 2,79% to 3,19%. The enterprise value of the company ranges from €228 billion in the worst scenario to €261 billion in the best scenario. Applied to the share price the sensitivity analysis yields a range from as low as €560,4 to as high as €642,7.

The terminal value we use to determine the company's value also greatly depends on the last cash flow and long-term growth rate we used to do so. Therefore, we analysed different growth rates while keeping the WACC constant.

Graph 17: Sensitivity Analysis Growth Rate



Source: Analysts estimates

Scenario Analysis

To factor in the risks ASML might face, we present a scenario analysis with a best- and worst-case scenario, depending on sales growth figures for the different business lines and possible risks. Comparing these two different cases demonstrates how important supply chain stability, technological developments, and protection against their risk factors are to ASML's market dominance and share price development.

- Worst-Case Scenario

The worst-case scenario considers an economic downturn in the short- and mid-term future. Combined with rising economic uncertainty and a decline in investments, this would have a detrimental effect on both the expansion of the world economy as well as international trade. This would increase the likelihood that resources required to continue the development of the new technologies may not be available from ASML's suppliers. Especially, the development of High NA EUV requires a significant R&D investment from ASML as well as from their suppliers. As a result, ASML's R&D costs would rise, and they may experience a significant fall in their margins and therefore slower revenue growth. Hence, the R&D will rise to 14% of revenue (compared to 11,02% in the base-case). This would also require ASML to postpone the introduction of High NA EUV and their product roadmap. Also, the adoption of EUV by consumers may be slower than anticipated if EUV and High NA EUV systems perform worse than anticipated.

This scenario implies that in addition to the aforementioned variations, ASML's operational efficiency would slightly decrease, necessitating an increase in CAPEX spending in order to meet the projected sales targets. We expect ASML's revenue to grow at a CAGR₂₂₋₂₇ of 9,61% (compared to 13,51% in the base-case) and an EBIT margin of 31,13% by the end of our forecasting period (compared to 37,65% in the base-case).

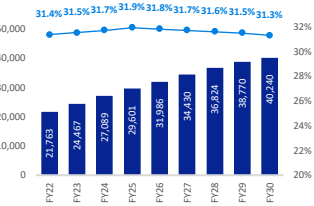
Assuming the same structure as in the base-case we derive a share price of €387,47, which is a 35,2% decline over our base-case. Even though ASML is a "high-quality" stock, there is a chance that its value could decline significantly. This is because it has considerably increased during the last decade.

- Best-Case Scenario

In the best-case scenario, we consider an earlier and stronger economic rebound than anticipated and therefore a more favourable environment for the semiconductor industry. The past shows us that long-cycle equipment companies like ASML are unlikely to see cutbacks in sales projections as a result of a typical sector downturn. As the recovery was more rapid, we anticipate slightly higher growth rates going forward. This also implies a higher likelihood that ASML and their customer are willing to invest the amount needed in R&D to develop the new anticipated technologies. Additionally, ASML could accelerate the rollout of High NA EUV and their product roadmap and by creating more capacity the adaptation of EUV and High NA EUV by customers will be quicker.

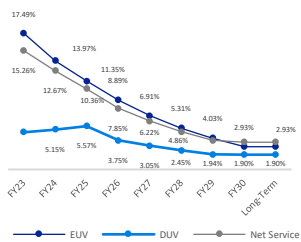
As a result of earlier EUV adaption, ASML would be able to improve on their margins, due to better margins on EUV technology and thus be able to achieve their anticipated

Graph 18: Revenue (€m) & EBIT margin (%) – Worst-Case



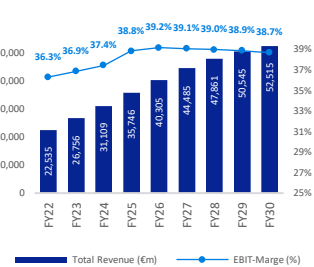
Source: Analyst estimates

Graph 19: Growth Rates - Worst-Case

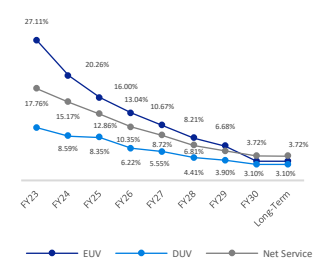


Source: Analyst estimates

Graph 20: Revenue (€m) & EBIT margin (%) – Best-Case



Graph 21: Growth Rates - Worst-Case



Source: Analyst estimates

gross profit margins of 54-56% by 2025. To accommodate the higher demand, we also assume an improved asset efficiency, thus having property, plant, and equipment as 16% of revenue (compared to 16,87% in the base-case). We expect ASML's revenue to grow at a CAGR₂₂₋₂₇ of 14,57% (compared to 13,51% in the base-case) and an EBIT margin of 38,73% by the end of our forecasting period (compared to 37,65% in the base-case).

Assuming the same structure as in the base-case we derive a share price of €638,45, which is a 6,6% increase over our base-case.

Conclusion

The expected share price for ASML for December 2023, as determined by the DCF valuation based on the assumptions outlined in this equity research report, is €598,35, which is 8,6% higher than the share price as of today (15.12.2022). With the key transition in semiconductor equipment technology to EUV and High NA EUV in the mid-term future, ASML is perfectly positioned as the sole supplier of EUV equipment. As the market learns more about ASML's strategy, we believe its shares should reflect their long-term customer commitment and robust forecast for future revenue growth, even though High NA EUV has little effect on projections in the near term, other from a R&D perspective. This leaves ASML with a strong outlook and a more favourable market position than its peers. The market seems to slightly undervalue the stock, consequently, our recommendation issued is a "HOLD".

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