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NOVA – School of Business and Economics.

SHIFTING TOWARDS THE FUTURE

—

HOW PORSCHE NAVIGATES THE TRANSITION TO ELECTROMOBILITY

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Part of:

SHIFTING TOWARDS THE FUTURE

—

HOW PORSCHE NAVIGATES THE AUTOMOTIVE INDUSTRY

A Project carried out on the Master in Finance Program, under the supervision of:
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Abstract

Porsche AG, a leading luxury car manufacturer, produces high-quality vehicles with a focus on performance. Porsche carries a long-lasting tradition, with its unique design and is known all around the world. The car manufacturer is currently undergoing a strategic transformation of its own product portfolio towards electric vehicles. We analyze Porsche's value using intrinsic (discounted cashflow) and relative (comparable companies/transactions analysis) valuation methods. The valuation is based on Porsche's market positioning, the current market environment, as well as key risks and opportunities. We highlight key drivers to which we attribute particular importance for Porsche's future business development. Based on our research and valuation, we assign a 'Buy' signal to the car manufacturer. Porsche AG's shares represent an attractive investment opportunity with considerable upside potential.

Keywords: Porsche, Valuation, Equity Research, E-Mobility

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PORSCHE AG

FINAL COMPANY REPORT

AUTOMOTIVE

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Shifting towards the future

How Porsche navigates the automotive industry

- Porsche demonstrated resilience to recent macroeconomic challenges including political conflicts, high energy prices and supply chain disruptions. The company is expected to capitalize on the forecasted growth in the luxury car market.
- Porsche outperforms its automotive competitors in profitability, underlining its exceptional financial performance. Its prestige and manufacturing excellence lead to a competitive advantage in the industry.
- The automotive industry faces different, ongoing challenges. Porsche has shown resilience within the automotive industry. The company will continue to advance its operations into the electric mobility market and grow in the future.
- Porsche's primary value driver will be revenue growth, led by Porsche's brand image and a strategic shift towards electric vehicles. This transformation, combined with cost uncertainty and future investments will lead to an increase in cost.
- Luxury companies have a valuation premium compared to automotive companies. Porsche already has a strong valuation compared to other carmakers, but there is still upside potential compared to luxury competitors.

Company description

Porsche is a renowned German automobile manufacturer that is known for its high-performance sports cars, SUVs, and sedans. Founded in 1931, the brand stands for luxury, innovation, and exceptional engineering. Porsche's iconic models, which are sold across the globe, include the 911, Cayenne, and Panamera. Over a year has passed since Porsche's successful IPO in 2022.

Recommendation: **BUY**

Price Target FY24: **108.23 €**

Price (as of 19-Dec-23) **80.64 €**

Refinitiv: P911_p.DE

52-week range (€) 79.84-120.45

Market Cap (€m) 73'280

Outstanding Shares (m, preferred) 455.5

Premium (%) 34.22

Source: Porsche AG, Refinitiv, own analysis

P911 vs. DAX40



Source: Refinitiv

(Values in € millions)	2022	2023E	2024F
Revenues	37'630	42'405	43'641
EBITDA	9'959	10'899	10'307
EBIT	6'770	7'167	6'466
Net income	4'957	5'084	4'601
FCF	1'665	1'319	2'861
EPS (€)	5.44	5.58	5.05
ROIC (%)	16.9	15.3	13.2
CapEx	4'533	5'920	4'495
Working Capital	9'912	11'283	11'653
Debt	18'281	31'799	30'073
Invested Capital	31'662	35'691	36'804

Source: Porsche AG, own analysis

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY MARKUS KLOTZ, LEON NEDDEN, MASTER IN FINANCE STUDENTS OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS. THE REPORT WAS SUPERVISED BY A NOVA SBE FACULTY MEMBER, ACTING IN A MERE ACADEMIC CAPACITY, WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL. (PLEASE REFER TO THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

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Company Overview

History

Founded in 1931 by Ferdinand Porsche in Stuttgart, Germany, Porsche is a car manufacturer associated with luxury, performance, and automotive excellence. Initially, the company did not produce cars under its brand name but provided motor vehicle development work and consulting services (Volkswagen Group, 2023). During this formative era, a preliminary version of the Volkswagen Beetle was conceived under Ferdinand Porsche's guidance, later becoming one of the most recognizable and best-selling automobiles in history. In 1939 the first Porsche-branded vehicle, the Porsche 64, was manufactured, using many components from the Beetle (Robtfrank, 2019). However, World War II interrupted further progress, temporarily diverting Porsche's efforts to military vehicle designs.

Post-war, in 1948, the Porsche 356 was introduced, marking the company's genuine advancements into sports car production (Robtfrank, 2019). The Porsche 356, developed by Ferry Porsche, son of the company's founder Ferdinand Porsche, set the precedent for Porsche's distinguished line of sports cars. Since then, the company has consistently redefined the standards of performance and luxury, especially with the launch of the 911 in 1964 – a model that remains emblematic of the brand to this day (Porsche Spokane, 2023).

Over the decades, Porsche diversified its line-up, venturing into new segments like sports utility vehicles (SUVs) with the Cayenne in 2002, and later, sedans with the Panamera in 2009 (Volkswagen Group, 2023). While these moves were initially met with scepticism, both models became significant commercial successes. These moves were strategic, aimed at broadening the customer base, and leveraging the brand's market share in segments with higher volumes and profitability. Additionally, Porsche's commitment to innovation led to adopting hybrid technologies and, more recently, fully electric models like the Taycan. This forward-thinking approach ensures that Porsche remains relevant in an industry undergoing rapid transformation due to environmental concerns and shifting consumer preferences and legislations (Porsche AG, 2023a).

Business Model

Porsche's business model is anchored in designing, manufacturing, and marketing high-end sports cars, SUVs, and sedans that combine luxury with performance. The company maintains a reputation for high quality and precise engineering, which allows it to command premium pricing for its vehicles.

Porsche's model range includes the iconic 911, the Boxster/Cayman, the Panamera, the Macan, and the Cayenne, with the Taycan representing its advancement into electric vehicles (Porsche AG, 2023a). Revenue streams are diversified, including direct vehicle sales, customization options, after-sales services, parts, and licensing. Porsche engages in technological development, emphasizing performance and sustainability, evident in its investment in electrification and digital services (Zoeller, 2023).

The brand's strong image is amplified by a global marketing strategy that emphasizes exclusivity and customer experience. Porsche's retail operations include a network of dealerships and experience centres, ensuring high customer engagement and loyalty (Porsche AG, 2023a).

Porsche also benefits from a synergistic relationship with VW through shared technology and platforms, while maintaining operational independence in strategic decision-making. This model has allowed Porsche to remain profitable and sustain its position as a leading luxury sports car manufacturer while evolving to meet the demands of a changing automotive landscape (Volkswagen Group, 2023). Digitalization is a key strategic thrust for Porsche, focusing on enhancing in-house digital capabilities and involving partners to shorten time-to-market for new products and business models. Utilizing artificial intelligence and data-driven optimizations, Porsche seeks to maintain its competitive edge in the automotive market (Porsche AG, 2023a).

Currently, Porsche's model is undergoing a strategic evolution to align with the company's vision for 2030, which is rooted in the pioneering spirit of Ferry Porsche. The strategic pillars of Porsche's business model are shaping its 2030 goals, which prioritize sustainability, customer experience, financial performance, and organizational excellence. Porsche intends to become balance-sheet CO₂-neutral across the entire value chain by 2030, reflecting a commitment to environmental and sustainable practices (Porsche Newsroom, 2023a). The push towards decarbonization, circular economy, and diversity within the company, as well as across its supply chain, highlights Porsche's approach to sustainability (Porsche Newsroom, 2023b).

Porsche's customer strategy revolves around creating premium experiences that bolster loyalty and attract new and long-lasting relationships. On the product front, Porsche is aligning its offerings with future customer requirements by embracing digital, connected, and innovative solutions. The company's product strategy extends beyond its core business of high-performance vehicles to include individual mobility solutions and financial services, contributing to growth and profitability (Porsche AG, 2023a).

Initial Public Offering

On September 29, 2022, Dr. Ing. h.c. F. Porsche AG ("PAG") announced its IPO plans and thus its emergence as an entity distinct from its position within the Volkswagen Group. Until this day, PAG's identity had been intertwined with that of VW, with its complete ownership residing under Porsche Holding GmbH. Porsche Automobil Holding SE ("PHSE"), representing the interests of the Porsche and Piëch families, was the entity previously representing the Porsche name in the public markets. Despite being a non-direct shareholder of PAG due to the intrigues resulting from the 2009 VW takeover attempt, through PHSE, the families maintained substantial influence over VW by holding a majority of the ordinary shares. This stake amounted to about one-third of VW's market capitalization (Steitz, 2022).

The IPO rationale was multifaceted. Central to this strategic move was the industry's transition towards battery electric vehicles (BEVs), creating the need for significant investment. The funds raised were thus planned for the dual objectives of developing future battery plants and scaling up BEV production capacities (Financial Times, 2022). Moreover, the IPO was a bid for Porsche to achieve greater operational independence and entrepreneurial flexibility, allowing its Executive Board to make decisions more autonomously. However, the extent of this autonomy could be moderated due to shared leadership roles within the VW-Porsche structure, with senior executives like Oliver Blume, who is CEO of VW and shared CEO of Porsche AG, and Lutz Meschke, shared CEO of Porsche, and Head of Investments at PHSE, holding critical positions across both entities (Porsche AG, 2023a).

A critical aspect of the IPO was Porsche's ambition to redefine its market perception. Traditionally valued as a premium automotive company, Porsche aspired to attain a valuation reflective of a luxury brand. This status would potentially unlock a valuation premium, like Ferrari's IPO in 2015. Financially, Porsche's impressive profit margins and growth rates positioned it alongside luxury manufacturers rather than its automotive counterparts, suggesting a systemic undervaluation as part of the larger VW Group (Tagesschau, 2022a).

On the IPO day, Porsche's capital was set at EUR 911m, evenly split between 455m preferred and 455m ordinary shares, each with a nominal value of EUR 1.00. The public offering consisted of 113,875,000 shares, inclusive of an over-allotment option, which represented a 12.5% stake in the company. All traded shares were preferred, carrying dividend rights (EUR 0.01 higher dividend rights than ordinary shares) but no voting power. However, in the case of insolvency, they would be treated equally to ordinary shares (Koehler, 2022).

The shares, which were launched in a price window of EUR 76.50 to EUR 82.50, quickly reached the upper price limit due to high demand, symbolizing investor confidence in Porsche's brand and growth prospects. Ultimately, the offering raised EUR 9.1bn for VW, slightly lower than the potential maximum due to an early halt in price stabilization by Bank of America, which partially exercised the over-allotment option (Tagesschau, 2022b). Consequently, with VW also transferring a 25% plus one ordinary share stake to PHSE, the total proceeds reached an impressive EUR 19.2bn. After the IPO, Porsche's shares began trading on the Frankfurt Stock Exchange, identifiable by the security identification number "PAG911" and symbol "P911," signifying the start of a new era for Porsche as a publicly traded company aiming to capitalize on its storied heritage and drive towards a future defined by luxury and electrification.

The IPO has a significant influence on the valuation. The raised capital provides Porsche with substantial financial resources, which is crucial for Porsche's strategic shift towards BEVs, allowing the company to invest heavily in developing future battery plants and expanding BEV production capacities. This enhances Porsche's competitive advantage in the rapidly evolving automotive industry, especially in the luxury electric vehicle segment.

Moreover, Porsche's ambition to be valued as a luxury brand rather than a conventional automotive company could lead to a higher valuation premium. Inspired by the success of Ferrari's IPO, Porsche aims to capitalize on its strong brand identity and high profit margins. Achieving a luxury brand status often comes with higher price points, greater brand loyalty and better profit margins, which makes the stock attractive to investors and leads to a higher market valuation.

Additionally, the IPO grants Porsche greater operational independence. This could foster a more flexible and responsive business strategy, allowing Porsche to capitalize on new opportunities and adapt quickly to market changes, which is particularly important in the luxury segment, where consumer preferences and technological advancements evolve rapidly.

Finally, Porsche's IPO can be considered a success regarding the high demand for shares. It reflects strong investor confidence in Porsche's brand and growth prospects. This confidence can enhance Porsche's market reputation and attract further investment, while contributing to a more robust and higher valuation in the public markets.

Market Overview

Macro environment

The global macroeconomic situation is currently characterized by geopolitical and economic challenges. At the forefront is the Ukraine-Russia conflict, which has significantly impacted the global economy, leading to heavily dropping growth prospects and inflating prices. The development has diminished business confidence and heightened investor uncertainty, resulting in potential capital outflows from emerging markets (Rogoff, 2022). As major commodity producers, disruptions in Russia and Ukraine have increased global prices for oil and natural gas to unprecedented levels, significantly impacting production costs across industries, including automotive manufacturing (Selfin, 2022). These disruptions could initiate a radical change in the global economic landscape, affecting everything from energy trade to processes and supply chains (United Nations, 2023).

At the same time, the conflict in Israel stokes additional geopolitical tension, potentially disrupting trade and technological collaborations. For Porsche, this means navigating through supply chain disruptions that are sensitive to future developments of international conflict, possibly leading to delayed production and vehicle delivery schedules (Smith, 2023).

Another macroeconomic challenge is imposed by inflation rates. As it decreases purchasing power, it increases production expenses parallelly due to the rising costs of materials and labour (Gorman, 2022). This upward pressure on consumer prices could temper the demand for luxury vehicles, with consumers potentially reallocating their spending toward necessities and away from luxury. Porsche, known for its high-quality engineering and premium pricing, may find its customers more price sensitive in such an economic environment.

Lastly, interest rates have a major impact on the automotive industry. Increasing rates translate into higher borrowing costs, deterring consumers from financing large-scale purchases like luxury cars. For automotive manufacturers, higher interest rates could mean more expensive loans for both operational needs and investments (Raymund, 2023). This double effect of reduced demand and increased production costs necessitates a strategic response from Porsche to safeguard its market position and profitability.

In this complex economic situation, marked by the implications of regional conflicts, inflationary pressures, and interest rate hikes, Porsche must exhibit strategic flexibility and resilience. Adapting to these conditions is critical to

sustaining its status as a premier luxury automobile manufacturer, ensuring that it continues to deliver the performance and exclusivity that its clientele expects, even in times of economic uncertainty.

However, in the past Porsche was very successful in navigating through crises. Even though Porsche experienced a decline of total units sold in 2020 compared to 2019, the total sales revenue did not decrease during the Covid-19 pandemic. The ongoing war in Ukraine since 2022 has not had a major impact on Porsche’s overall sales so far, but caused material prices and inflation to rise, therefore driving costs.

Operating environment

In 2021, the global car market volume was estimated at 75m units sold (Guan, M. et al., 2022), of which a majority of 73.5m cars was in the non-luxury segments, which includes cars up to a value of EUR 80k. In terms of revenues, this non-luxury segment accounted for about 94% of the total EUR 2.7tn in revenues of the global car market. In terms of expected growth, however, the non-luxury segment is forecasted to experience the lowest ten-year CAGR with 1%, reaching a market volume of EUR 81tn in 2031. The luxury segment can be further divided into four segments (Guan, M. et al., 2022), which each are expected to grow with a ten-year CAGR of 8% or more.

Figure 1 shows the five segments, of which the three segments between EUR 80k and EUR 500k are currently relevant for Porsche. Only the Macan and 718 series are currently offering models with a starting price below EUR 80k. Because Porsche offers models in all but one segment currently, its automotive portfolio is very well positioned to serve different target groups. Although there are no concrete plans known, Porsche might develop a new hyper car in the future, belonging to the segment above USD 500k, like the discontinued 918 Spyder.

By using our revenue forecast per model, which can be found below, and by allocating each model’s revenues to the respective segment, we find that Porsche, in 2023, makes a majority of 63% of their revenues in the segment between EUR 80k-150k, corresponding to a market share of 15.6% in the segment (see Appendix 1). Although we expect Porsche to continuously increase their revenues, our forecast indicates a loss in market share in all luxury segments. The main reason behind this development are new market entrants that are expected to gain market share due to advantages in BEV and technology.

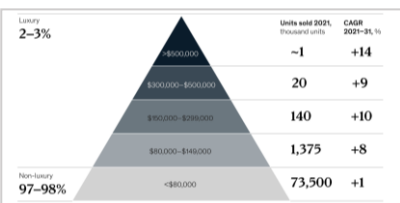


Figure 1: Car market segmentation (Source: McKinsey & Company)

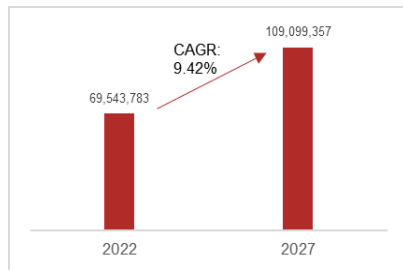


Figure 2: HNWI development
(Source: Knight Frank)

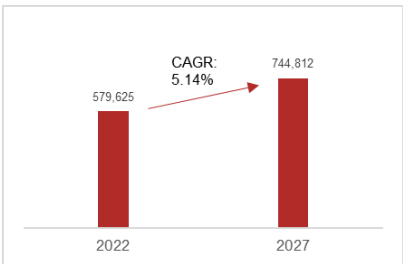


Figure 3: UHNWI development
(Source: Knight Frank)

Because Porsche serves all these different segments, the customer base can be described as extensive. Porsche profits from its long success in car manufacturing, the trademark “Made in Germany”, a stellar brand image as well as history in racing. In a recent loyalty study by J.D. Power, Porsche ranked first in the premium car category in the U.S. (2023). Porsche attracts customers throughout all age groups who can afford their cars. Two important customer groups are those of high-net-worth individuals (HNWI) and ultra-high-net-worth individuals (UHNWI). These groups are classified by a net worth above USD 1m and USD 30m respectively (Hayes, 2023), making them the perfect target groups for exclusive models like 911 special editions with price tags above EUR 275k or the Panamera Executive edition with a price tag above EUR 200k. Based on research by Frank Knight, the HNWI group is forecasted to grow at a CAGR of 9.42% and the UHNWI at a CAGR of 5.14% until 2027 (see figure 2 and 3).

Porsche has managed the art of remaining true to original brand values and designs, while at the same time introducing technology and attaching particular importance to topics such as sustainability. According to a survey by Accenture, 64% of buyers are concerned about sustainability and look at alternative options to internal combustion engine (ICE) vehicles for their next purchase (2021). So far, they managed to inspire long-time Porsche enthusiasts and collectors as well as younger customer groups who attach particular importance to digital topics, customization, and sustainability. Porsche announced a gradual change of their portfolio from ICE vehicles to EVs, with the goal of reaching an 80% share of fully electric vehicles by 2030. In their report, Accenture also showed customers’ willingness to pay a premium for sustainable options in the automotive industry (2021). This will benefit Porsche’s pricing power even more in the future and allow them to continuously retrieve higher prices year-over-year.

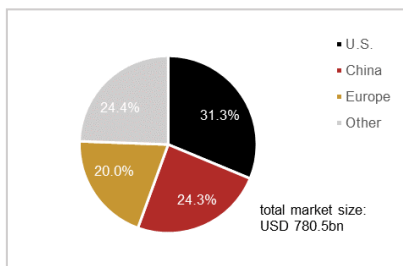


Figure 4: SUV market, 2023
(Source: Statista)

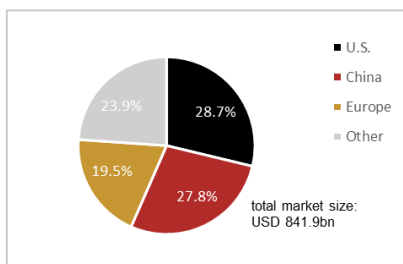


Figure 5: SUV market, 2027
(Source: Statista)

Another trend that benefits Porsche is the growing demand for SUVs. The global SUV market is expected to grow at an CAGR of 1.91%, reaching a market size of USD 841.9bn in 2027 (see figure 4 and 5; Statista, 2023). A McKinsey survey shows that around 50% of luxury-car buyers are thinking about a SUV for their next purchase. This extreme demand caused even manufacturers such as Ferrari and Lamborghini, who are originally known for their sports cars, to introduce SUV models. Even in the top luxury segment, there are manufacturers catering to this trend, such as Rolls Royce with the Cullinan and a price tag above USD 750k. Porsche’s Macan and Cayenne series are both attributable to the SUV segment and are historically responsible for more than 50% of Porsche’s overall automotive sales. Additionally, the share of electric SUVs is gaining momentum and is expected to be the biggest driver of the SUV demand (Guan, M. et al., 2022). Therefore, Porsche is currently working on fully

electrifying the Macan and Cayenne series, while also working on a new, fully electric SUV concept even bigger than the Cayenne series, catering to the electric SUV demand in the luxury segments.

Geographically, Porsche splits its sales market into five key regions: Germany, Europe without Germany, North America excl. Mexico, China incl. Hong Kong and the rest of the world (Porsche AG, 2023). In 2022, China was the biggest region, responsible for 30.2% of sales revenue, followed by 27.2% in North America and 18.9% in Europe without Germany. China is expected to be the biggest growth driver for the luxury car market as well as the SUV market due to an accelerated increase of HNWI and UHNWIs (Guan, M. et al., 2022). Additionally, the U.S. continues to play an important role due to its large share in the ongoing SUV trend.

Porsche's strategy towards customization and technology is especially important in the Chinese market, as Chinese buyers put an emphasis on the importance of these factors when buying new cars (Guan, M. et al., 2022). Just recently, Porsche announced an expanded partnership with Google, bringing the best of both worlds into the cars providing advanced connectivity and Google services (Porsche AG, 2023).

Based on the operating environment presented above, we determined five key drivers that are responsible for Porsche's expected growth in the future. The implications in our valuation are described in the *forecast section*:

- 1) Luxury car market growth
- 2) HNWI and UHNWI growth
- 3) Porsche's stellar brand image, quality, and pricing power
- 4) The global trend towards sustainability, (B)EVs
- 5) The global trend towards SUVs

Competitive Environment

▪ Automotive Market

General Motors (GM) is a major player in the automotive industry and covers a wide range of segments from trucks and crossovers to luxury vehicles. This diverse product line, including brands like Chevrolet, Buick, GMC, and Cadillac, brings GM a broad customer base, differentiating it from Porsche's more targeted luxury and performance market. GM lays a strategic focus on EVs and autonomous technologies, which seems to be comparable to Porsche's initiatives. GM's significant global footprint, especially in key markets like North

America and China, is comparable to Porsche's international reach, although GM's market penetration and brand recognition are more extensive due to its mass-market appeal.

Tesla can be recognized as a leader in the EV market. While Porsche is on its way to increasing the shares of BEVs in their fleet, Tesla solely focuses on BEVs. Tesla's pioneering role in the electric vehicle industry, with models like the Model S and Model X, sets a benchmark in performance, luxury, and technology, offering strong competition to Porsche's similar offerings. Unlike Porsche, Tesla's direct-to-consumer sales model disrupts traditional dealership. Additionally, Tesla uses cross-selling strategies, offering additional energy solutions and battery technology with the goal to improve the overall BEV infrastructure and thus increasing convenience for customers. Tesla's distinct brand identity, centred on sustainability and state-of-the-art technology, has established it as a strong player in the luxury EV space in recent years.

Mitsubishi offers a range of economic models, SUVs, and electric vehicles. The brand's business model contrasts to Porsche's luxury and performance-focused line-up. While Mitsubishi caters to a broader market with its more affordable and practical models like the Mirage and Outlander, its commitment to electrification and advanced technology aligns with Porsche's focus in these areas. Mitsubishi's strong presence in Asia, along with its extensive dealership network, provides a different market approach compared to Porsche's exclusive and luxury-oriented branding. Mitsubishi's strategy balances affordability, practicality, and technological advancement, aiming to provide a wide range of options for consumers, from economical vehicles to more technologically advanced electric models.

BMW Group, which is composed of brands like BMW, MINI, and Rolls-Royce, stands as a direct competitor to Porsche in the luxury and performance segments. Both companies emphasize high-end vehicles and are at the forefront of electric mobility innovation (BMW i series). BMW has a larger product range compared to Porsche's more specialized line-up, starting with smaller models like the Mini Cooper or the BMW 1, and reaching to ultra-luxury limousines from Rolls-Royce. BMW's global presence, strong brand equity, and commitment to luxury and performance make it a key player in the same space as Porsche. Both brands symbolize automotive excellence and have a strong global presence.

Mercedes-Benz (MB), known for its luxury, performance, and innovation, closely parallels Porsche in the premium automotive sector. Both brands are synonymous with high-quality, performance-oriented vehicles, and are actively transitioning towards electric mobility. MB's 'Electric only' strategy, featuring

vehicles like the EQS, can be compared to Porsche's electrification efforts with the Taycan. MB offers a diverse range of cars that is similar to BMW's fleet, and thus bigger than Porsche's offering. It starts with the smaller A-class and includes the renowned S-Class and performance-focused AMG line. Furthermore, MB's global reach and longstanding reputation in luxury and innovation position it as a key competitor and benchmark for Porsche. Both companies' commitment to combining luxury with technological advancement underlines their role as trendsetters in the evolving landscape of the luxury automotive industry.

Volvo Group is a Swedish producer of cars and trucks that is known for quality and security. The brand offers a different perspective compared to Porsche's focus on luxury cars. However, Volvo's emphasis on digitalization, sustainability, and global expansion, especially in the United States and Asia, aligns with some of Porsche's strategic themes. Both companies are committed to innovation and adapting to market dynamics, although in different sectors of the automotive industry. Volvo's reputation for safety and sustainability, particularly in its passenger vehicles, is similar Porsche's commitment to high-quality and technologically advanced vehicles. Volvo's approach to global expansion and embracing new technologies, including electric and autonomous vehicles, is another parallel to Porsche's strategies. It highlights a shared focus on adapting to and leading in the evolving automotive landscape.

Nissan offers a diverse portfolio that contrasts with Porsche's focus on luxury and high-performance vehicles. The brand has a focus on electrification and enhancing customer experience that aligns with Porsche's initiatives in the luxury and electric mobility sectors. Nissan's global reach and its strategy to overcome market challenges demonstrate a resilience and adaptability that provide a broader perspective compared to Porsche's more niche market focus. Nissan's commitment to innovation, evident in its electric vehicle line-up and advancements in driver-assistance systems, reflects a shared interest with Porsche in advancing automotive technology.

Porsche's position in the automotive market is distinguished by its consistent focus on luxury and high-performance vehicles. Unlike its peers such as GM, Tesla, or Nissan, Porsche maintains a niche approach, concentrating on a select range of sports cars and luxury SUVs. This specialization grants Porsche a unique brand identity and prestige, contributing to its competitive advantage in the luxury segment.

Porsche's dedication to technological innovation, particularly in electric mobility as demonstrated by the Taycan, keeps it at the forefront of industry trends. This strategic alignment with the future of automotive technology places Porsche in

direct competition with EV leaders like Tesla, yet its legacy and expertise in engineering high-performance vehicles offer a distinct edge in the luxury EV market.

Porsche's global market presence is comparable to that of giants like GM and BMW, yet it differentiates itself with a focus on exclusivity and premium branding. This approach resonates with a specific customer base that values both performance and luxury, setting it apart from more mass-market oriented brands under GM or the varied portfolio of BMW.

In terms of size, Porsche operates on a smaller scale compared to conglomerates like GM or the diverse BMW Group, allowing for a more focused and agile approach to market changes and consumer demands. This agility, combined with a strong brand heritage and a reputation for quality, positions Porsche favorably against competitors in the luxury automotive sector.

Financially, Porsche has outperformed its automotive peers in recent years (Table 1). The company has a stable three-year revenue growth of nearly 10% and is most profitable both on EBITDA and EBIT level, which proves the profitability of their business model. Additionally, Porsche has the second highest ROIC after Tesla, underlining the competitive advantage of car producers in pricier segments.

Moreover, Porsche's strategy of balancing traditional combustion engine models with innovative EVs appeals to a wide range of consumers, from traditional sports car enthusiasts to environmentally conscious buyers. This balanced approach, along with a commitment to sustainability and luxury, provides Porsche with a significant competitive advantage in adapting to the evolving demands of the global automotive market.

Peer group financial KPIs	Country	Market cap	D/E	3y CAGR	EBITDA	EBIT	NOPAT	ROIC
		EURm	%	%	%	%	%	%
General Motors Company	USA	47,534	215.6%	6.7%	15.2%	8.2%	6.5%	5.6%
Tesla Inc., Ltd.	USA	320,481	0.9%	52.3%	21.7%	17.1%	13.5%	23.3%
Mitsubishi Motors Corp.	Japan	4,970	59.7%	-1.4%	9.4%	7.0%	5.4%	11.5%
BMW AG	Germany	56,891	125.8%	11.0%	22.7%	16.6%	11.7%	10.7%
Mercedes Benz AG	Germany	68,234	123.7%	-4.6%	18.2%	13.8%	9.7%	8.7%
Volvo AB	Sweden	34,999	52.6%	19.8%	8.0%	4.6%	3.7%	12.8%
Nissan Motor Corp.	Japan	13,604	358.6%	-1.8%	10.6%	4.4%	3.4%	3.1%
Louis Vuitton Moet Hennessy SE	France	374,806	9.4%	13.8%	33.7%	25.9%	19.4%	20.5%
Kering S.A.	France	59,106	18.9%	8.6%	34.3%	26.1%	19.6%	20.0%
Ferrari N.V.	Italy	36,845	7.6%	10.6%	34.9%	24.2%	18.4%	17.5%
Hermes International SCA	France	153,982	1.3%	19.0%	45.6%	40.3%	30.2%	28.1%
Porsche SE	Germany	86,317	21.2%	9.7%	26.5%	18.0%	12.6%	15.0%

Table 1: Peer group financial KPIs (Source: Companies, own analysis)

▪ Luxury Market

LVMH is a luxury conglomerate that is mainly comprised of companies in the fashion and lifestyle segment. Prominent brands are Louis Vuitton, Christian Dior,

Fendi, Givenchy, Bulgari, Hublot, among others. LVMH shares Porsche's commitment to high-end quality and exclusivity. While Porsche excels in luxury automotive engineering, LVMH dominates the luxury fashion and lifestyle sector. Both companies supply a client base that is categorized by high solvency and thus looking for premium quality and brand prestige. LVMH's diverse product range appeals to various aspects of luxury lifestyle, paralleling Porsche's range of luxury sports cars and SUVs. Both entities command significant market presence in their respective domains, maintaining a premium brand image and a focus on delivering exceptional quality.

Kering S.A., with luxury brands like Gucci, Saint Laurent, and Balenciaga, is a French luxury conglomerate. Kering's portfolio is comprised by high-fashion and luxury accessories, targeting a market segment that values exclusivity and style. Both companies have global presence, and Kering's fashion influence spanning major fashion capitals, comparable to Porsche's worldwide automotive reach. Their product portfolios, though different in nature, cater to a demographic that seeks status and luxury, underpinning their premium pricing strategies and brand positioning in the luxury market.

Ferrari is a renowned Italian producer of high-performance sports cars, whose target market aligns closely with Porsche's luxury automotive niche. Both brands are symbolic of automotive excellence, offering vehicles that represent a mix of performance, luxury, and exclusivity. Ferrari limits its production volumes to maintain that exclusive status. Ferrari and Porsche share a client base of affluent customers who value not just the product, but the prestige and lifestyle associated with the brands. Ferrari's racing heritage and Porsche's motorsport legacy further underline their appeal to a client base that appreciates engineering prowess and brand reputation.

Hermès International is a renowned company in the luxury goods sector. Renowned for its high-end leather goods and lifestyle products like jewelry, perfumes and watches, Hermès emphasizes craftsmanship, exclusivity, and a prestigious, but in comparison to the other luxury brands, more understated brand image. Both Porsche's and Hermès' products seem to be customized for clients that value more than just the product - they seek the prestige and lifestyle associated with owning a piece from such esteemed brands. Hermès also has a strong artisanal approach and lays high focus on the training of its staff to be continuously to deliver state-of-the-art products, which is a similar approach to Porsche.

Porsche's position in the luxury market is distinguished by its focus on combining high-performance engineering with luxury and exclusivity. Unlike its peers in the

broader luxury sector, such as LVMH or Hermès, Porsche has honed its specialization in luxury automotive manufacturing, establishing a unique identity in this space. Compared to Ferrari on the other hand, Porsche's fleet is broader and includes also less pricier models, meaning that it can approach a larger client base. Its dedication to automotive excellence gives Porsche a competitive edge in the luxury car market.

Porsche's commitment to innovation, especially in electric mobility with models like the Taycan, aligns with the luxury sector's move towards sustainability and technological advancement. This strategic direction not only places Porsche at the forefront of the automotive industry's evolution but also enhances its appeal to environmentally conscious consumers, which represents a growing segment in the luxury market.

Financially, although having strong double-figure operating margins and ROIC, Porsche cannot reach the extraordinarily high margins of its peers in the luxury segment. The main reason for this is most likely high production costs, which luxury fashion retailers do not face, and thus are able to sell with higher margins.

In comparison to luxury fashion houses like LVMH and Kering, or even other luxury automakers like Ferrari, Porsche has a more diverse product range. This versatility in product offering, combined with a consistent focus on quality and brand heritage, strengthens Porsche's position as a multifaceted luxury brand.

Key Risks

- Supply chain disruptions

In recent years, the automotive industry needed to overcome several challenges influencing the overall operating environment. Ranging from an overall drop in production during the Covid-19 pandemic to war breaking out in Europe.

The global supply chain disruptions that first emerged during the Covid-19 pandemic and have resurfaced because of the war in Ukraine have led to significant challenges in the procurement of materials and parts. This has had a particular impact on companies that rely on an extensive network of suppliers. Porsche has around 1400 suppliers for production materials and 5400 suppliers for non-production materials. In 2020, the first year of the pandemic, these disruptions contributed to a 2.6% decline in overall industrial production compared to 2019 (De Santis, R.A., 2022). Porsche's production and sales¹ were also affected, declining compared to 2019 (276,888 to 264,989). As a result of its

¹ Units sold

market position and the associated scope for pricing, Porsche managed not to lose any revenue despite the decline in sales figures. In addition, a quick recovery was achieved, and sales rose to 297,289 units sold in 2021 and 313,721 units sold in 2022. Even with these advancements, the effects of these disruptions are still felt in 2023, but less intensely. Uncertainty is expected in the future, particularly given the high costs of energy and basic materials. Porsche's sales proportion of all-electric vehicles decreased in 2022 compared to 2021, mostly because of supply problems with key components for the Taycan production. The manufacturing of BEVs is even more reliant on certain commodities and resources, such as lithium, the price of which has increased significantly in recent years (Xu et al. 2020). Risk management and price hedging as well as supplier relationships will therefore continue to play a significant role in securing production materials and prices. Ensuring the availability of necessary materials and components is key for Porsche to mitigate the impact of disruptions to the global supply chain. The company's approach to overcoming these challenges includes a strategic focus on long-term supplier relationships, which are critical to the continued production of its vehicles, particularly all-electric models such as the Taycan. These strategies are critical for Porsche to maintain its production and sales momentum in the face of current and future supply chain uncertainties.

- **Semiconductor shortage**

Another critical component in the automotive industry, especially for BEV production, are microchips. The automotive industry has not been spared from the shortage of semiconductors. S&P Global estimates the impact of the crisis in a decline of around 9.5 million cars that could not be produced due to chip shortages. In the first half of 2023, this impact is still estimated at 524,000 vehicles worldwide. Compared to internal combustion engines (ICE), BEVs require a significantly higher number of microchips. These semiconductor chips are crucial for the control of power conversion in electric vehicles, the development of autonomous driving technologies and the centralization of the powertrain. In 1978, a Porsche 911 had one electric control unit and eight semiconductors. An EV today requires around 5,000 – 7,000 semiconductors, depending on how sophisticated the technology is. According to estimates, semiconductors worth USD 1,400 per car will be installed by 2028, whereas this figure is currently still around USD 500 (S&P Global, 2023). The more advanced the technology, the more chips will be needed, making the design and integration of these systems increasingly complicated. Porsche Consulting has designed a framework to ensure a stable supply in the long term. This involves gathering data on the use and availability of semiconductors, long-term demand planning

and establishing a direct relationship, possibly even joint ventures, with semiconductor manufacturers. In response to the overall manufacturing complexity, Porsche is also heavily involved in funding start-ups with innovative solutions to optimize this complicated manufacturing process.

Additionally, the semiconductor industry is highly centralized in terms of geography and market participants. 92% of the most advanced microchips and 60% of the less advanced microchips for further production needs are supplied by Taiwan Semiconductor Manufacturing Company (TSMC). In addition, 80% of microchips are manufactured either in Japan, China, South Korea, or Taiwan. As TSMC is a Taiwanese company, a potential conflict between Taiwan and China would again lead to extreme supply shortages of semiconductors and impact global markets.

- China

Looking at competitors, especially China generated several new market entrants in the EV market. These players are supported by China's government through subsidies, tax exemptions and special sales requirements for new companies (Favino, 2022). However, they mostly focus on more affordable cars; the most popular EV in China started at around USD 4,500 in 2021. Other competitors, like Tesla from the United States, or Polestar, Volvo's EV brand, were already able to produce models with better performance metrics in some cases.

China's influence goes beyond mere market entry. China is also the largest manufacturer of batteries for EVs, with CATL alone controlling more than 30% of the market share (Favino, 2022). This dominance is further emphasized by the fact that 75% of EV battery production is in China. Combined with China's control over rare earths elements and extremely short and efficient supply chains, Chinese manufacturers can exploit cost advantages of up to 20%. This currently makes every player in the EV market dependent on China to a certain extent. However, this dependency is problematic due to various arguments such as poor labour conditions or geopolitical tensions.

In response to this growing influence, various countries are taking measures to regulate Chinese involvement in their markets. For example, the U.S. imposes a 27.5% tariff on Chinese vehicles to deter Chinese manufacturers from entering the market. In addition, the U.S. government is heavily regulating partnerships with China, such as the joint venture between Ford and CATL to build a USD 3.5 billion battery factory in Michigan. India has taken a similar stance, blocking all Chinese manufacturing facilities within the country.

The European Union faces a unique challenge. With an inflexible environmental agenda that includes a complete ban on ICEs by 2035, but without adequate measures and incentives to encourage the production of EVs, the EU is in a precarious position. The relatively low tariff rate of 10% on Chinese vehicles suggests that importing EVs could become the main solution to meet market demand and domestic car manufacturers will continue to lose market share. EVs produced in China currently have an 8% market share in Europe, which is expected to grow to 15% by 2025. The European automotive industry needs to heavily invest and expand its efforts in battery production if they want to close the gap (Cornet et al., 2023).

- **Production costs**

BEVs are currently more expensive to manufacture than ICEs due to several key factors. The most expensive component of a BEV is the battery, which adds significantly to the overall price. As described above, batteries require rare and expensive materials such as lithium, cobalt and nickel, and the sourcing and refining of these materials adds to the cost. Secondly, EVs often require advanced technologies for energy management and sophisticated software for features such as autonomous driving, which further increases production costs. In addition, EVs do not yet have the economies of scale in production that ICE vehicles benefit from due to their longer established manufacturing processes and more developed supply chains. However, a recent study by the Fraunhofer Institute for Systems and Innovation Research has shown that although EVs initially generate higher costs for the purchase and charging infrastructure, they offer considerable cost-saving potential over a long lifetime (15 years+), depending on the size of the vehicle (2023a).

Based on Porsche's performance over the last few years and the company's effective risk management, we are confident in the assumption that Porsche will continue to overcome the difficult current circumstances and will also be able to manage any future obstacles. Regarding production costs, Porsche needs to continue to leverage supplier relationships to secure both material supply and prices. It will also need to further invest into R&D to reach more cost efficiencies in production like shared base components.

Opportunities

Both the luxury car market and the EV market will experience strong growth in the coming years. Porsche will therefore have the opportunity to position itself even more clearly in these markets in the coming years.

Porsche, on its path to electromobility and sustainability, will continue to build models that remain true to their line, without compromising on quality and performance, and continue to excite buyers. The company is well equipped to become a key European player in the (luxury) EV market. It has already proven to be on the right track with the launch of the Taycan series. Further steps must now follow to successfully establish Porsche in the (luxury) EV market.

Production wise, concrete plans for this are already being implemented, with the full electrification of the 718 series, as well as the indicated development of a new full-electric SUV (Guan et al., 2022). In 2022, Porsche opened its first production site outside of Europe in Malaysia, to better cater to the Asian market. However, unlike many competitors, Porsche still mainly produces in Germany. This offers unrivalled opportunities to attract future EU- and German-based subsidies, aiming for more sustainable cars and the EU's goal of banning ICE vehicles by 2035.

Porsche's general R&D efforts, based in Weissach, Germany, will play a major role in the company's future success. By installing a R&D hub in Shanghai, Porsche took the right steps to better understand its biggest market, China, and develop products that fulfil the specific Chinese demands. Overall, Porsche will continue to streamline production processes and reach a shared base for components of similar models, realizing better economies of scale and overall faster production times. Additionally, Porsche already heavily invests in developing high-tech batteries as well as the battery production cycle itself. The main goal is to build high-voltage batteries that can be recycled into a second use cycle and a general improvement in terms of efficiency.

From an investing perspective, Porsche authorized higher budgets to focus on innovating areas like recycling, waste reduction, production efficiency and sustainability (Porsche AG, 2023a). The company's efforts in cooperation with partner firms to optimize the recycling process of EV batteries presents another step towards a more sustainable value creation, for example by recycling valuable raw materials (Porsche AG, 2023a). Through investments into their charging network, using premium partners, Porsche can ensure that the network is globally extended and provides convenient solutions for their customers. By partnering with elite establishments such as hotels, restaurants, golf clubs or marinas, Porsche benefits by receiving free marketing at elite locations, which they in turn advertise as charging options in the navigation system.

Another aspect will be the balance between tradition and technology. As technology and connectivity become more and more important, this is another opportunity to position the company for the future. At the same time, it will be

important to retain traditional design elements and give them sufficient importance, as these often trigger emotions in buyers and can determine the success of a model series. Finally, we must not forget the appeal and prestige the Porsche brand carries; therefore, many stakeholders will closely watch Porsche's future developments, especially towards EVs.

To summarize, there are currently many players in the electric vehicle market, from start-ups to long-established car manufacturers. However, we expect the market to consolidate in the coming years. This is due to the significant resources required for R&D, production, and regulation, which favours larger, established companies that can quickly adapt to market changes. Based on this we attest Porsche a competitive advantage in the coming years. They are already on the right track to align their product portfolio for different markets and demands. Through the R&D measures mentioned above, Porsche will make relevant progress and create new models that will continue to evoke emotions in their customers and increase their sales in the long term.

Value Drivers and Forecasts

Revenues

Porsche's revenue is split into revenue from the automotive segment and revenue from the financial services segment. Historically (FY2018-2022), the automotive segment has always generated more than 90% of Porsche's total revenue. Revenue from the automotive segment will remain the most important value driver for Porsche.

Since the introduction of the 718 series in 2017, which combines the Boxter and Cayman series, Porsche has offered a total of six model series. These include the Macan and Cayenne model series (both SUVs), the Taycan model series (BEV), the Panamera model series (saloon) and the 911 and 718 model series (sports cars). We have used a mixture of price trends and the number of units sold to forecast the automotive segment. Based on the five main drivers for Porsche (luxury car market growth, HNWI/UHNWI growth, brand image, global trend towards sustainability and global trend towards SUVs), we have derived effects for both price development and the number of vehicles sold.

In general, higher prices will be necessary in the future to compensate the general cost development, especially in relation to material prices and the production of EVs (*see cost section*). On the price side, we therefore expect the greatest effect to come from cost coverage and Porsche's market position and pricing power. Porsche's consistency in terms of quality, tradition and ability to

evoked emotions has enabled the car manufacturer to build a loyal, constantly growing customer base willing to pay high prices. This is followed by the effect of the growing luxury car market and the increasing demand for luxury cars. In this market, generally higher prices can be demanded due to the use of high quality materials, advanced technology, excellent craftsmanship and brand image. We expect prices to rise continuously, partly due to demand and partly due to rising production costs and extra services such as personalization. Through Porsche's market position, the company will be able to capitalize on these trends and grow in the coming years.

We attribute the similar effect to the global trend towards SUVs and sustainability and the growing number of (U)HNWI. This is due to the fact that Porsche has to compete in all these areas. In the (U)HNWI market, Porsche competes with even more exclusive car manufacturers, such as Lamborghini or Ferrari. In the EV market, Porsche is competing with manufacturers from China who have more efficient supply chains or manufacturers who have dedicated themselves entirely to EVs, such as Tesla. In the SUV market, Porsche competes against manufacturers trying to establish themselves more in the luxury segment, like Mercedes-Benz and other luxury manufacturers entering the SUV market to extend their product offering, like Lamborghini or Ferrari to. Nevertheless, we expect Porsche to continue to operate successfully in these markets through its strategic focus combined with its positioning in the luxury segment.

Price development (p.a.)	Effect	Macan	Cayenne	Taycan	911 Series	Panamera	718 Series
Luxury car market growth	0.50%	yes (0.5x)	yes	yes	yes	yes	yes (0.5x)
Cost compensation + Porsche brand	1.00%	yes	yes	yes	yes (2x)	yes	yes
SUV trend	0.25%	yes	yes	no	no	no	no
HNWI / UHNWI growth	0.25%	yes	yes	yes	yes	yes	yes
Sustainability trend	0.25%	no	no	yes	no	no	no
	2024F	1.75%	2.00%	2.00%	2.75%	1.75%	1.50%
	2030F	2.00%	2.25%	2.00%	2.75%	2.00%	1.75%

Table 2: Price development
(Source: own analysis)

In our forecast, we have taken a slightly more conservative approach to the development of the number of cars sold. This is primarily due to the current macroeconomic situation and the gradual conversion of model series to electric engines. It remains to be seen how fully electric Cayenne or 718 models, for example, will be accepted by the market. We assume that a substitution effect will set in over the next few years and that Porsche will gradually replace ICE vehicles through EV sales. In addition, the main drivers will also ensure that Porsche will sell more cars from year to year. Porsche's brand image, together with the growing luxury market and the increasing demand for SUVs, will ensure that the Cayenne and Macan series will remain extremely important models. Historically, these two model series have been responsible for over 50% of the

cars sold. Since the launch of the Taycan series in 2019, it has seen an exorbitant increase in sales (3y CAGR: 527.45%). These growth rates will be slowed down in the future by the introduction of further EV models, for example fully electric 718 models. Should the other EVs in general come close to replicating the success of the Taycan, Porsche will be able to generate significant value for its shareholders.

Units sold development (p.a.)	Effect	Macan	Cayenne	Taycan	911 Series	Panamera	718 Series
Luxury car market growth	0.50%	yes	yes	yes	yes	yes	yes
Porsche brand	0.50%	yes	yes	yes	yes	yes	yes
SUV trend	0.15%	yes	yes	no	no	no	no
HNWI / UHNWI growth	0.25%	yes	yes	yes	yes	no	no
Sustainability trend	0.10%	no	no	yes (5x)	no	no	no
	2024F	1.40%	1.40%	1.75%	1.25%	1.00%	1.25%
	2030F	1.50%	1.50%	1.25%	1.25%	1.10%	1.35%

Table 3: Units sold development
(Source: own analysis)

Porsche's financial services segment generates revenue mostly through car financing and leasing contracts. Historically (2019-2022), the share of total sales revenue attributable to the financial service segment has always been below 10%. Porsche will focus on developing its EV portfolio and extending its revenue through the automotive segment. Financial services are merely a by-product that is necessary to be able to sell vehicles through financing options. Therefore, we do not expect any significant developments in the financial services segment that would justify an extraordinary increase in value. Due to the overall increasing number of cars sold, the number of financing contracts outstanding will inevitably increase as well. We expect the average value per contract to grow at 2% p.a., to account for the EU's inflation target (European Central Bank, 2022). In our forecast period, the financial services revenue share will decrease to around 7% of the total sales revenue. Overall, we forecasted revenues to grow from EUR 43,641m in 2024 to EUR 56,967m by 2032. This represents an overall revenue increase of 30.5% and a CAGR of 3.4%.

Revenue share (EUR m)	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Automotive revenue	40,247	41,640	43,082	44,574	46,119	47,718	49,440	51,232	53,083
% of total sales revenue	92.2%	92.3%	92.5%	92.6%	92.7%	92.8%	92.9%	93.1%	93.2%
Financial services revenue	3,393	3,451	3,510	3,570	3,631	3,692	3,755	3,819	3,884
% of total sales revenue	7.8%	7.7%	7.5%	7.4%	7.3%	7.2%	7.1%	6.9%	6.8%
Total Sales Revenue	43,641	45,091	46,592	48,144	49,749	51,410	53,196	55,051	56,967

Table 4: Revenue shares
(Source: own analysis)

We expect the inflation rate to return to the ECB's target of 2% p.a. by 2027. After deducting the inflation rate, Porsche reaches a steady state with a long-term growth rate of 3.5% p.a. in 2030.

Growth rates (yoy)	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Nominal growth rate	2.9%	3.3%	3.3%	3.3%	3.3%	3.3%	3.5%	3.5%	3.5%
Inflation rate	3.5%	3.0%	2.5%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Real growth rate	-0.6%	0.3%	0.8%	1.3%	1.3%	1.3%	1.5%	1.5%	1.5%

Table 5: Growth rates
(Source: ECB, own analysis)

Costs

The most uncertain driver in terms of forecasting is the cost of materials. Material prices have experienced an extreme increase in recent years. In addition, there is the constantly growing demand for specific materials to produce EVs. The spot prices of these partly very rare elements have been subject to extreme fluctuations in recent years. These materials will play an increasingly important role for Porsche in the future, on their mission to gradually transform their product portfolio into 80% EV by 2030. The future development remains to be seen, but these materials are likely to become increasingly expensive due to global demand. One measure to mitigate this trend is long-term partnerships with suppliers and the resulting improved price security. Mercedes-Benz, for example, concluded a supply contract with Rock Tech Lithium for 10,000 tons of lithium hydroxide per year in October 2022 (Fraunhofer ISI, 2023b). Some companies go one step further and invest directly in mining companies, such as Ford, with a USD 4bn investment in an Indonesian nickel mine (Fraunhofer ISI, 2023b). Porsche will also secure long-term supply contracts as already mentioned. In addition, we see potential in Porsche's R&D department, particularly in the form of developing more efficient batteries, as well as recycling and reusing materials. Nevertheless, we have included premiums for the general market uncertainty and rising demand for materials in our forecast.

We expect R&D to play a particularly important role in the company over the next few years, which will increase R&D costs in the coming years. This trend can be supported by several aspects: Improving sustainability, growing EV production, more efficient production, and an ever-increasing need for technology. Porsche is constantly working on improving the company's CO₂ footprint over the entire life cycle of its products. The car manufacturer aims to push ahead with the development of more efficient batteries. Particular attention will be paid to the more efficient use of critical materials and the batteries used in EVs. Research is currently being carried out with partners into recycling options, with the aim of producing batteries that can be recycled for a second use cycle. At the same time, they are involved in the development of alternative fuels (eFuels). We expect Porsche to increase the usability of various basic components for similar models in the future. This can lead to cost savings in the production process. In addition, the increased demand for personalization and networking means that technological details must be constantly adapted and improved to meet requirements.

For Porsche to continue to build high-quality cars and live up to its brand standards, it needs great people. We are therefore certain that it is in Porsche's

interest to retain talent in the long term as well as to attract new talent. Porsche will continue to pay above-average salaries to be able to continue to expect maximum commitment from its staff in the face of increasing production costs. We expect the production benefits from R&D efforts and investments to be partially offset by the general increase in demand, as well as the increased demand for personalized vehicles and higher technology levels. Historically, the average number of units sold per employee was around 8 vehicles. We do not expect any significant improvements in the forecasting period because the production processes are already highly automated. Porsche will therefore have to continue to hire additional staff in the future to meet the rising production requirements.

Growing production and increased R&D expenditure require corresponding investments in property, plant, and equipment. We expect increased investments in the coming years, which will grow in line with revenues. These include, for example, the expansion of production facilities, the expansion of the global footprint and equipment for the R&D centres. In addition, Porsche will invest in its charging network for EVs in the coming years to expand it worldwide. The network currently comprises over 4,200 charging stations in 75 countries, with more than 2,600 located in Europe. Porsche is working with selected partners and aims to expand this network to over 7500 charging stations by 2025.

Overall, we do not expect a significant improvement on the cost-side in the following years, because of needed investments, raw material price uncertainty and personnel costs.

Cost forecast (EUR m)	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Material costs	(20,655)	(21,572)	(22,531)	(23,535)	(24,587)	(25,438)	(26,324)	(27,243)	(28,196)
R&D costs	(2,618)	(2,705)	(2,796)	(2,889)	(2,836)	(2,776)	(2,713)	(2,642)	(2,564)
Personnel costs	(5,663)	(6,008)	(6,342)	(6,696)	(7,069)	(7,462)	(7,878)	(8,317)	(8,780)
Depreciation & amortization	(3,841)	(3,969)	(4,101)	(3,531)	(3,649)	(3,771)	(3,902)	(4,038)	(4,178)
Other	(4,931)	(5,095)	(5,265)	(5,440)	(5,622)	(5,809)	(6,011)	(6,221)	(6,437)
Total costs	(37,710)	(39,349)	(41,035)	(42,091)	(43,762)	(45,257)	(46,828)	(48,460)	(50,156)
<i>% of revenue</i>	<i>86.4%</i>	<i>87.3%</i>	<i>88.1%</i>	<i>87.4%</i>	<i>88.0%</i>	<i>88.0%</i>	<i>88.0%</i>	<i>88.0%</i>	<i>88.0%</i>

Table 6: Cost forecast
(Source: own analysis)

Debt

Forecasting future debt levels is essential for our valuation because it directly impacts the company's financial health and risk profile. High levels of future debt can suggest potential liquidity problems and increased financial risk, depending on future inflation and interest rate environments, which can affect the company's ability to invest, grow, and meet its obligations. Additionally, understanding future debt helps in assessing the cost of capital and the valuation of equity, as it influences the leverage and the risk-return tradeoff for investors.

There are multiple factors that can be possible indicators for Porsche's future debt level (Table 7). Firstly, Porsche's historical debt level can be taken as a base. For calculating D/E ratios, the market value for both debt and equity is commonly used. Since debt is considered fixed income and debt holders have a preferred claim over equity holders, the probability of a default, and thus the risk is usually considered low. Therefore, the market value of debt can be estimated with its book value. On the other hand, Porsche's stock did not start trading before September 2022 and thus has no historical track record of prices before this date. In the end of 2022, Porsche's D/E ratio was 21.1%, with a total debt amount of 18,281 EURm and a market capitalization of 86,317 EURm.

Looking at Porsche's competitors in both the automotive and luxury market, the results show that these companies, especially in the automotive market, are more levered than Porsche. Although Porsche proved that it could leverage its operations and grow revenues with significantly lower debt levels than its competitors, which proves the profitability of their operations, a slight D/E movement towards industry averages can be expected. Another reason why an increase in debt levels can be expected is the planned enlargement of their BEV fleet, which requires large investments into R&D and production capacities. Especially in Europe, governments increase pressure on car manufacturers by making laws that promote the sole manufacturing and sale of BEVs in the medium-term. Thus, besides the sustainable incentive, there is also a regulatory incentive for Porsche to further invest in this field.

Interest rates always play a crucial role in the debt levels of companies. The lower the interest rates, the cheaper the funding, and thus the higher the incentive to leverage the company's capital structure. The current interest rate environment is characterized by historical peaks, which can be traced to the current macroeconomic situation and the countermeasures against high inflation rates. Since this policy could cause inflation rates to first stagnate and then to drop, interest rates were not further increased recently, and are expected to drop again during the second half of 2024, making debt a more attractive tool again for companies. In line with interest rates, the whole economic conditions are expected to improve in the medium-term, including political tensions named above and macroeconomic policies. This would cause consumer spending into the economy, including corporate debt, to increase.

One argument against an increase in debt levels is Porsche's recent IPO, which gives them the opportunity to raise further capital through equity capital markets, especially in times of optimistic valuations on the markets. However, the

Debt development	
Porsche's D/E ratio 2022A	21.0%
Historical ratios	—
Comparable companies	▲
Strategic announcements	▲
IPO	▼
Regulatory impact	▲
Interest rates	▲
Economic conditions	▲
Credit ratings and market access	▲
Total expected D/E ratio	34.0%
Total expected D/EV ratio	25.3%

Table 7: Debt development
(Source: Porsche AG, own analysis)

arguments for an increase in Porsche's debt level prevail, and our analysis results in a target debt level of 34% for Porsche.

Valuation

Scenario analysis

Based on the current macroeconomic situation and Porsche's market positioning, we have prepared a scenario analysis by defining three scenarios and using the weighted average of these scenarios as the basis for our valuation. Our base case scenario is based on the assumptions and forecasts presented above. For the best-case and worst-case scenarios, we have identified drivers that we would expect to have a potential impact on Porsche's business. We have differentiated between macroeconomic, industry-specific, and company-specific events. Macroeconomic events include the Ukraine war, material and energy costs and inflation. If the Russia-Ukraine conflict is resolved soon, we expect sales to develop positively, especially in Russia. At the same time, we would expect an improvement in the cost structure related to materials and distribution. Should current material and energy prices normalize more quickly, this would also have a positive impact on Porsche's costs. Finally, if inflation reaches the 2% target more quickly, we expect sales to increase as financing becomes cheaper. At the same time, Porsche would have to pay less inflation compensation in wage adjustments. However, if these events worsen, we expect to see reverse effects that will impact Porsche's sales and increase the cost of materials, distribution, and personnel.

For the industry-specific events, we have developed scenarios based on the shortage of semiconductors and the supply chain. If Porsche can quickly enter significant partnerships with suppliers and establish a more efficient supply chain, we expect a positive impact on material and distribution costs. However, the effects could also develop in a negative direction and raise costs if the market for key materials deteriorates, or it becomes more difficult to improve the supply chain. Lastly, the company-specific events look at Porsche's goal to transform its product portfolio to 80% (B)EVs and the continuation of its pricing power. In each case, we would expect to see an impact on sales and R&D costs.

These effects were added and charged to the corresponding positions of the base-case scenario. The weighted scenario consists of 70% base-case, 15% best-case and 15% worst case scenario and forms the foundation for our valuation.

Discounted Cash Flow

To value Porsche we first performed a discounted cash flow (DCF) valuation, using the weighted average cost of capital (WACC). In our valuation, we used European yields for AAA-rated bonds provided by the European central bank (2023) as the risk-free rate. We retrieved a levered beta β_e of 0.987 from Bloomberg², which we then unlevered using the tax rate and the D/EV ratio as calculated (see *debt section for more information*). The beta provided by Bloomberg most accurately reflects Porsche's market volatility as other methods have resulted in significantly lower betas. The market return was calculated by adding a market risk premium of 5% (Damodaran, 2023) to the retrieved risk-free rates. For the cost of debt, we used the bonds issued by Porsche Automobil Holding SE as a proxy, as Porsche itself has not issued any corporate bonds. Using the inputs described above, Porsche's target D/EV ratio of 25.3% and a tax rate of 30% we calculated a WACC for each year in the forecast period (see *Appendix 2 for more information*).

Porsche has a total of 911m shares outstanding, representing its subscribed capital (Porsche AG, 2022). These 911m shares are divided into 455.5m ordinary shares that carry voting rights and 455.5m preferred shares that carry no voting rights but are entitled to an extra dividend of EUR 0.01 per share (Porsche AG, 2022). During its IPO, Porsche only listed the 455.5m preferred shares (Porsche AG, 2022). The ordinary shares are currently held by Volkswagen AG and Porsche SE (Porsche AG, 2022). In our DCF valuation, we therefore derive a price per share for the listed 455.5m preferred shares. This share price includes an extra value of EUR 58.09m, to account for the extra dividend each preferred share is entitled to.

Our DCF analysis obtained a preferred share price of EUR 108.23 for Porsche AG. We also performed a sensitivity analysis, by increasing and decreasing the terminal growth rate of 3.5% and the calculated WACCs by 50bps and 100bps.

DCF key components (EUR m)	
Sum of all discounted cashflows	21,065
Core terminal value (PV)	98,156
Core business value	119,221
Non-core business value	4,976
Enterprise value	124,197
Net debt	25,708
Minority interest	8
Equity	98,480
Total shares available (m)	911
Price per share (€)	108.10
Total discounted value of extra dividends	59
Price per preferred share (€)	108.23

Table 8: DCF overview
(Source: Porsche AG, own analysis)

		WACC				
		-1%	-0.5%	as calculated	+0.5%	+1%
Terminal Growth Rate	2.5%	116.58	92.42	75.45	62.87	53.16
	3.0%	148.21	112.33	88.98	72.56	60.40
	3.5%	203.08	142.92	108.23	85.65	69.78
	4.0%	321.63	196.00	137.83	104.28	82.45
	4.5%	768.10	310.67	189.17	132.92	100.48

Figure 7: Sensitivity analysis
(Source: own analysis)

² Adj. Beta (estimated future beta by Bloomberg)

Multiples valuation

- Comparable Company Analysis

Following the discussion on Discounted Cash Flow (DCF) valuation, we complement the intrinsic valuation approach with a relative valuation framework in form of a Comparable Company Analysis (CCA). CCA offers a practical perspective on Porsche's value by benchmarking its financial performance against a selected group of competitors from both the automotive as well as the luxury market. It acknowledges the market's current perception of value, while the DCF strictly relies on intrinsic value based on future cash flow projections with underlying assumptions.

The market-driven approach of the CCA represents a strong advantage over DCF, which demands precise inputs for highly uncertain drivers like cash flows and discount rates. CCA leverages real-time market data, thus capturing the impact of current market conditions. It operates under the premise that similar companies should be valued comparably, thus providing an alternative to the absolute figures derived from a DCF model. However, the method's reliance on market valuations also introduces its primary drawback. Market prices are susceptible to subjective valuations and market distortions, which can complicate value comparisons. Furthermore, finding truly comparable firms, especially in the case of Porsche, can be challenging, and adjustments for differences in growth, risk, and cash flow potential are often necessary (Chen, 2020).

In our CCA (*Appendix 3*), we assess both Enterprise Value (EV) multiples (EV/Sales, EV/EBITDA, and EV/EBIT) and Equity Value multiples (P/E – short for Price-to-earnings ratio). EV/Sales does not consider the profitability of the analysed company, but solely looks at the scale of their operations, which is why it is often used when analysing companies that have varying profit margins or that are not profitable yet. However, it can also be useful when comparing more mature companies, simply by comparing their valuation in relation to the scale of their operations. EV/EBITDA is often used for its capital structure neutrality and the exclusion of non-cash expenses like depreciation and amortization, which often vary substantially between companies due to the regulatory flexibility of their treatment. The multiple subtracts all operating costs and is particularly useful in the automotive industry where capital investments and depreciation methods can significantly vary. EV/EBIT does include these non-cash expenses, which can lead to material differences depending on the industry of the analysed company. Lastly, the P/E ratio is one of the most direct tools for linking market expectations to a company's earnings potential. It symbolizes the net income after each fiscal year, that can be attributed to every shareholder.

When comparing the derived multiples, we find that the luxury segment yields significantly higher relative valuations compared to the automotive segment. Especially the valuations of Hermès and Ferrari stand out, but also Kering and Louis Vuitton Moët Hennessy are priced above automotive companies in relative terms. There are multiple possible explanations for this difference. Firstly, companies in the luxury segment tend to be less levered, meaning they have lower D/E ratios compared to automotive companies, which means that these companies can finance large parts of their investments internally. This leads to less dependency on interest rate developments and less risk perceived by investors. On top of that, all four luxury companies were able to increase their sales over the last three years, with none or only slight decreases during the pandemic. This proves that although the performance of these companies is perceived to have a high correlation with the market, they are resistant and able to manoeuvre crises well. Lastly, these companies are more profitable on EBITDA, EBIT and Net income level. Their return on invested capital (ROIC) also surpasses automotive competitors. These margins are likely caused by the premium prices that luxury clients are willing to pay for these products.

Another possible explanation could be the timelessness of luxury goods, paired with the increasing number of high-net-worth-individuals (HNWI) and ultra-high-net-worth-individuals (UHNWI), which are common customers with the sufficient buying power in these pricy segments. On top of that, especially within the current macroeconomic and operating environment described above, car producers are facing severe difficulties, leading to comparably lower valuations now.

Among the automotive companies, the valuation of Tesla stands out. The American car manufacturer reaches significantly higher multiples than its peers in the automotive industry. The most probable explanation for these extraordinary high multiples is the expected potential that investors see in Tesla due to their pioneering foray in the production of BEVs. Additionally, Tesla's cars are more expensive compared to its peers. Other producers in the pricier segments like BMW or Mercedes-Benz do also offer cheaper cars, which Tesla does not. Therefore, Tesla could arguably also count towards the luxury segment, which generally achieves higher valuations as explained above.

Generally, in the automotive sector, cars with a value of EUR 80,000 or more are luxury cars. Our expectations imply that out of Porsche's total revenues in 2023, only 16% stem from car sales with a price below that threshold, meaning that most of the revenues are generated by the sale of luxury cars. This is a strong argument for counting Porsche towards the luxury segment rather than the

automotive segment. Although Porsche is already valued at a premium to our automotive peer group, we believe that there is further upside potential and that Porsche, in line with the above argumentation, can reach even higher multiples which are closer to those in the luxury segment.

- **Comparable Transaction Analysis**

Comparable Transactions Analysis (CTA), which compares multiples of precedent transactions in the respective industries, represents another relative valuation method. Unlike for the CCA method, these transactions often include private companies, which comes along with two main differences that must be considered when comparing the multiples. Firstly, these transactions often transfer controlling shares in the respective target companies, so instead of just valuing the value of each specific share, the deal values often contain a control premium. This control premium can often lead to higher valuations in CTA relative to DCF and CCA and can be explained by strategic value that buyers may perceive in a target company beyond its financial metrics alone (CFI, 2022). On the other hand, a notable disadvantage arises from information asymmetries, especially when dealing with private companies or hardly communicated deal structures, which makes the true economic rationale behind the transaction values harder to understand for third parties (Cooper et al., 2023). This effect is, however, minimal for our valuation, since we concentrated our analysis on large deals, which tend to have deeper coverage and thus a higher amount of publicly disclosed information.

CTA typically focuses on recent transactions, because valuations are very dependent on market and investor sentiments, which can change rapidly. However, for companies of Porsche's size, it makes sense to extend the time frame, because it is hard to find similar transactions and it is more useful to take a closer look at transactions with similar deal values. We limited our scope for transactions in both the automotive and luxury industry on the time frame of the last 10 years, so starting in 2013 until today. While the market environment has changed significantly during these ten years, which leads to the multiples not being perfectly representative for the current market environment, we could access a broader variety of transactions that eventually give a representative picture of usual valuation multiples in these industries.

Like the CCA, EV/Sales, EV/EBITDA and EV/EBIT multiples are analysed (*Appendix 4*). Since most companies included in the CTA do not disclose their financials, information on net income is not public, which is why P/E is not analysed in the CTA. To put less emphasis on outliers, a primary focus is laid on

median values of multiples in the following. The first and third quartile of multiples represent the upper and lower border of each multiple.

Looking at the filtered transactions, we find that overall, the transactions in the luxury segment reach significantly higher valuations each on Sales, EBITDA, and EBIT level. These results are in line with the results of our CCA, where the luxury segment also reached higher multiple valuations. The reasons provided in the CCA section are believed to be main drivers for this difference in the transaction multiples. In the automotive sector, especially the Ferrari acquisition by Fiat Chrysler in 2015 as well as the PSA Peugeot-Citroen transaction in 2019 are of high interest as both are global car manufacturers and thus have similar brand characteristics as Porsche. Ferrari, as described above, is categorized into the luxury segment and PSA Peugeot-Citroen in less pricier segments. Just by comparing these two transactions, the observation of multiple premiums for the luxury segment from above is approved again. In the luxury segment, mentionable transactions here are the ones of Jimmy Choo in 2017, Tiffany & Co in 2019 and Valentino Fashion Group in 2023, each of them exceeding EV/Sales of 2.5x and EV/EBITDA of 20.0x.

Recommendation

We value Porsche at EUR 108,23 per share using the DCF approach. This valuation is supported by further valuation techniques using the multiples approach. Porsche is therefore undervalued and holds a potential upside of 34.22%³ as of the valuation date (19th Dec 2023) – we therefore assign Porsche AG (ticker: P911) a strong buy signal.

The following *figure 8* shows an overview of all valuation results presented in this report.

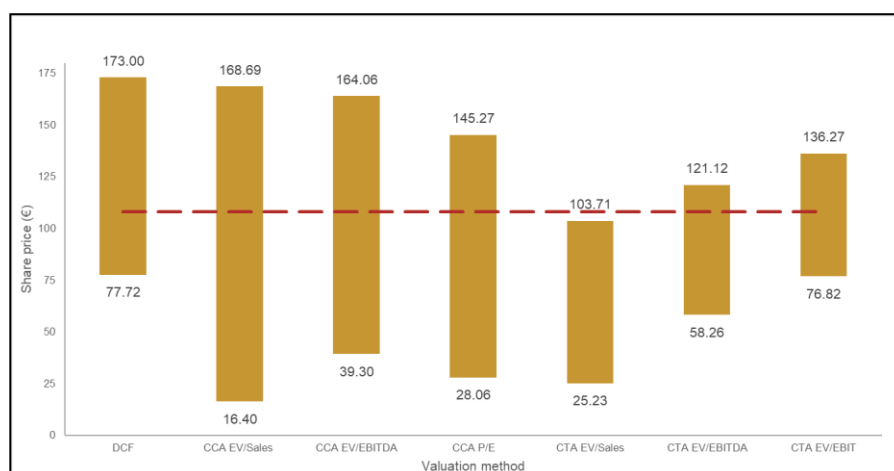


Figure 8: Valuation results
(Source: own analysis)

³ Porsche AG, closed share price retrieved from <https://investorrelations.porsche.com/en/share/> on 19th Dec 2023

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Appendix

Appendix 1: Overview market share development

Revenue per Model	Model	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
	Macan	5,634	6,068	6,500	6,707	6,920	7,139	7,366	7,600	7,841	8,118	8,404	8,701	
	Cayenne	8,830	11,951	12,285	12,534	12,964	13,408	13,868	14,343	14,835	15,396	15,978	16,583	
	Taycan	4,851	4,076	5,434	5,639	5,853	6,074	6,304	6,543	6,790	7,013	7,242	7,480	
	911 Series	5,580	6,271	8,454	8,795	9,150	9,519	9,903	10,302	10,718	11,150	11,600	12,068	
	Panamera	3,980	4,470	4,516	4,641	4,769	4,901	5,037	5,176	5,319	5,486	5,657	5,833	
	718 Series	1,250	1,604	1,880	1,932	1,985	2,040	2,097	2,155	2,215	2,278	2,349	2,418	
Price Category	Min Price	Max Price	Macan	Cayenne	Taycan	911 Series	Panamera	718 Series						
Distribution per Model	-	80,000	65%	0%	0%	0%	0%	60%						
	80,000	150,000	35%	80%	80%	50%	70%	40%						
	150,000	300,000	0%	20%	20%	45%	30%	0%						
	300,000	500,000	0%	0%	0%	5%	0%	0%						
	500,000	1,000,000	0%	0%	0%	0%	0%	0%						
Revenue Porsche	Min Price	Max Price	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	-	80,000	4,412	4,907	5,353	5,519	5,689	5,865	6,046	6,233	6,425	6,644	6,872	7,106
	80,000	150,000	18,993	21,851	24,590	25,305	26,182	27,091	28,031	29,005	30,013	31,094	32,218	33,380
	150,000	300,000	6,441	7,368	8,703	8,984	9,311	9,650	10,002	10,366	10,744	11,145	11,561	11,993
	300,000	500,000	279	314	423	440	457	476	495	515	536	558	580	603
	500,000	1,000,000	0	0	0	0	0	0	0	0	0	0	0	0
Market Share Porsche	Min Price	Max Price	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	-	80,000	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%
	80,000	150,000	14.1%	15.0%	15.6%	14.9%	14.2%	13.6%	13.1%	12.5%	12.0%	11.5%	11.0%	10.6%
	150,000	300,000	23.9%	24.9%	26.7%	25.1%	23.6%	22.3%	21.0%	19.8%	18.6%	17.6%	16.6%	15.6%
	300,000	500,000	4.1%	4.2%	5.2%	5.0%	4.7%	4.5%	4.3%	4.1%	3.9%	3.8%	3.6%	3.4%
	500,000	1,000,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Appendix 2: Overview WACC calculation

WACC	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Cost of Equity	7.7%	7.3%	7.0%	6.9%	6.8%	6.8%	6.8%	6.8%	6.8%
Cost of Debt	2.9%	3.1%	3.4%	3.6%	3.8%	3.9%	4.0%	4.1%	4.1%
E/EV	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%
D/EV	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%
Tax Rate	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Core WACC	6.27%	5.98%	5.83%	5.78%	5.78%	5.80%	5.82%	5.83%	5.83%

Appendix 3: Comparable Company Analysis

Company	EV	EV/Sales	EV/EBITDA	EV/EBIT	P/E
	EURm	x	x	x	x
General Motors Company	123,153	0.83x	5.42x	10.11x	5.61x
Tesla Inc., Ltd.	302,597	3.91x	18.02x	22.87x	26.78x
Mitsubishi Motors Corp.	3,808	0.21x	2.27x	3.06x	4.06x
BMW AG	106,418	0.75x	3.29x	4.48x	3.48x
Mercedes Benz AG	128,290	0.86x	4.71x	6.19x	4.71x
Volvo AB	47,366	1.06x	13.26x	23.00x	11.37x
Nissan Motor Corp.	48,425	0.63x	5.98x	14.36x	8.46x
Louis Vuitton Moet Hennessy SE	399,100	5.04x	14.94x	19.47x	26.61x
Kering S.A.	65,962	3.24x	9.45x	12.41x	16.35x
Ferrari N.V.	38,261	7.51x	21.52x	31.06x	39.51x
Hermes International SCA	146,691	12.64x	27.76x	31.36x	45.73x
Porsche SE	100,879	2.68x	10.13x	14.90x	17.41x

Median		1.06x	9.45x	14.36x	11.37x
Average		3.33x	11.51x	16.22x	17.52x
Upper bound - 75th percentile		4.47x	16.48x	22.94x	26.70x
Lower bound - 25th percentile		0.79x	5.07x	8.15x	5.16x

Porsche projected share price (€)					
Median		27.85	87.20	140.87	61.87
Average		121.65	109.75	161.19	95.31
Upper bound - 75th percentile		168.69	164.06	234.70	145.27
Lower bound - 25th percentile		16.40	39.30	73.00	28.06

Appendix 4: Comparable Transaction Analysis

Target	Buyer	Seller	Date	EV	EV/Sales	EV/EBITDA	EV/EBIT
				EURm	x	x	x
Aurobay Technology Co Ltd	Renault SA		11.07.23	4,000	0.56x		
Dowlais Group plc	Existing shareholders	Melrose Industries plc	20.04.23	1,874	0.35x	3.61x	
Hella GmbH & Co KGaA	Forvia SE		14.08.21	5,672	1.10x	8.00x	15.70x
PSA Peugeot-Citroen SA	Stellantis NV		18.12.19	19,062	0.30x	2.60x	4.30x
Altran Technologies SA	Capgemini SA	Altamir SCA, Seven2 SAS	24.06.19	5,037	1.70x	12.30x	16.70x
GKN Ltd	Melrose Industries		19.04.18	9,890	0.90x	8.10x	12.50x
BorgWarner Technologies Ltd	Delphi Automotive Plc	Aptiv plc	13.11.17	3,918	1.00x	8.40x	14.00x
Ferrari SpA	Fiat Chrysler Automobiles NV	Stellantis NV	03.12.15	7,135	2.90x	11.90x	20.80x
Pirelli & C SpA	Consortium led by ChemChina	Camfin SpA	23.03.15	8,116	1.30x	7.10x	9.70x
Scania AB	Volkswagen AG		21.02.14	6,660	1.70x	13.30x	17.90x
Gates Industrial Corp	Blackstone Inc	Onex Corp	04.04.14	3,940	1.80x	10.00x	16.40x
Valentino Fashion Group SpA	Kering SA	Mayhoola For Investments LLC	27.07.23	1,700	4.00x	16.20x	
Tiffany & Co	LVMH SE		25.11.19	14,724	3.70x	15.90x	20.50x
Jimmy Choo Group Ltd	Capri Holdings Ltd	JAB Holdings BV	25.07.17	1,158	2.90x	17.70x	24.50x
Christian Dior SE	Bernard Arnault		25.04.17	12,111	1.40x	5.90x	7.90x
Douglas GmbH	CVC Advisers Ltd	Advent International Corp	01.06.15	2,800	1.10x	10.90x	
Hermes International SCA	LVMH shareholders	LVMH SE	03.09.14	6,843	7.50x	2.90x	23.20x

Median				1.40x	9.20x	16.40x
Average				2.01x	9.68x	15.70x
Upper bound - 75th percentile				2.90x	12.55x	20.50x
Lower bound - 25th percentile				1.00x	6.80x	12.50x

Porsche projected share price (€)						
Median				41.75	84.50	105.80
Average				67.05	89.70	100.60
Upper bound - 75th percentile				103.71	121.12	136.27
Lower bound - 25th percentile				25.23	58.26	76.82

Financial Statements

	2021	2022	2023E	2024F	2025F	2026F
Income Statement						
Total sales	33,138	37,630	42,405	43,641	45,091	46,592
Cost of sales	(18,748)	(22,506)	(24,717)	(26,319)	(27,579)	(28,873)
Gross profit	14,390	15,124	17,688	17,322	17,512	17,718
Core result	3,777	4,595	4,674	4,188	4,055	3,924
Non-core result	316	2,418	739	733	737	742
Financial result	8	(109)	(244)	(235)	(235)	(235)
Total comprehensive income	4,101	6,904	5,169	4,686	4,557	4,431
Balance Sheet						
Operating working capital	7,995	9,912	11,283	11,653	11,987	12,328
Core fixed assets	16,232	17,233	19,217	20,175	21,023	21,895
Core invested capital	24,226	27,145	30,500	31,828	33,009	34,224
Non-core invested capital	10,246	4,517	5,190	4,976	4,955	4,936
Total invested capital	34,472	31,662	35,691	36,804	37,964	39,160
Total Financing	11,545	14,644	27,566	25,716	25,411	25,125
Equity (book value)	22,927	17,018	8,125	11,087	12,553	14,035
Cash Flows						
Unlevered operating CF	1,941	1,665	1,319	2,861	2,873	2,710
Unlevered non-operating cash flow	(3,133)	8,157	66	947	759	761
Financing CF	1,192	(9,822)	(1,385)	(3,808)	(3,632)	(3,471)
Others						
Gross profit %	43.4%	40.2%	41.7%	39.7%	38.8%	38.0%
EBITDA	8,528	9,959	10,899	10,307	10,252	10,206
EBIT	5,314	6,770	7,167	6,466	6,283	6,105
ROIC	15.6%	16.9%	15.3%	13.2%	12.3%	11.5%
D/EV	16.4%	15.9%	25.3%	25.3%	25.3%	25.3%

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Report Recommendations

Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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SHIFTING TOWARDS THE FUTURE –
HOW PORSCHE NAVIGATES THE TRANSITION TO ELECTROMOBILITY

Leon Noman Nedden, 50970

A Project carried out on the Master in Finance Program, under the supervision of:

Rosário André, Francisco Martins

20th December 2023

This report is part of the joint report “Shifting towards the future – How Porsche navigates the automotive industry” (annexed), developed by Markus Klotz and Leon Noman Nedden and should be read as an integral part of it.

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Introduction

This report is part of a joint equity research report, aiming to value the shares of Porsche AG (P911). The joint report provides an insight into Porsche itself, the current market situation, the competitive landscape, key risks and opportunities, and various valuation methods, with a presentation of the results at the end of the report.

The joint report examines Porsche, the operating environment and the car manufacturers standing within its competition. Five key drivers – Porsche's brand image, the luxury car market growth, the growth of (ultra-)high-net-worth-individuals, the global trend towards sustainability and the global trend towards SUVs – together with key risks, form the base for Porsche's revenue and cost forecasting. Porsche holds a strong market position, great value potential and the ability to push the company's ongoing growth. The DCF valuation finds a share price of EUR 108.23 for Porsche AG, which is supported by the findings of relative valuation methods. The results show that Porsche AG is currently undervalued and therefore is assigned a 'Buy' signal.

This individual report includes a part of the current market situation in the form of Porsche's operating environment, the key risks and opportunities, an insight into the value drivers of the Income Statement, as well as the DCF valuation. Not included in this individual report are the company presentation, further market analysis, particularly an assessment of the competition, as well as the relative valuation in the form of trading and transaction multiples.

Market Overview

Operating environment

In 2021, the global car market volume was estimated at 75m units sold (Guan, M. et al., 2022), of which a majority of 73.5m cars was in the non-luxury segments, which includes cars up to a value of EUR 80k. In terms of revenues, this non-luxury segment accounted for about 94% of the total EUR 2.7tn in revenues of the global car market. In terms of expected growth, however, the non-luxury segment is forecasted to experience the lowest ten-year CAGR with 1%, reaching a market volume of EUR 81tn in 2031. The luxury segment can be further divided into four segments (Guan, M. et al., 2022), which each are expected to grow with a ten-year CAGR of 8% or more.

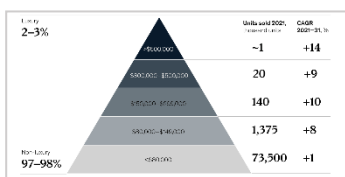


Figure 1: Car market segmentation (Source: McKinsey & Company)

Figure 1 shows the five segments, of which the three segments between EUR 80k and EUR 500k are currently relevant for Porsche. Only the Macan and 718 series are currently offering models with a starting price below EUR 80k. Because Porsche offers models in all but one segment currently, its automotive portfolio is very well positioned to serve different target groups. Although there are no concrete plans known, Porsche might develop a new hyper car in the future, belonging to the segment above USD 500k, like the discontinued 918 Spyder.

By using our revenue forecast per model, which can be found below, and by allocating each model's revenues to the respective segment, we find that Porsche, in 2023, makes a majority of 63% of their revenues in the segment between EUR 80k-150k, corresponding to a market share of 15.6% in the segment (see Appendix 1). Although we expect Porsche to continuously increase their revenues, our forecast indicates a loss in market share in all luxury segments. The main reason behind this development are new market entrants that are expected to gain market share due to advantages in BEV and technology.

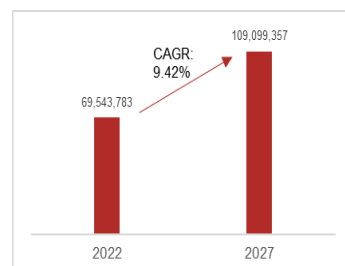


Figure 2: HNWI development (Source: Knight Frank)

Because Porsche serves all these different segments, the customer base can be described as extensive. Porsche profits from its long success in car manufacturing, the trademark "Made in Germany", a stellar brand image as well as history in racing. In a recent loyalty study by J.D. Power, Porsche ranked first in the premium car category in the U.S. (2023). Porsche attracts customers throughout all age groups who can afford their cars. Two important customer groups are those of high-net-worth individuals (HNWI) and ultra-high-net-worth individuals (UHNWI). These groups are classified by a net worth above USD 1m and USD 30m respectively (Hayes, 2023), making them the perfect target groups for exclusive models like 911 special editions with price tags above EUR 275k or the Panamera Executive edition with a price tag above EUR 200k. Based on research by Frank Knight, the HNWI group is forecasted to grow at a CAGR of 9.42% and the UHNWI at a CAGR of 5.14% until 2027 (see figure 2 and 3).

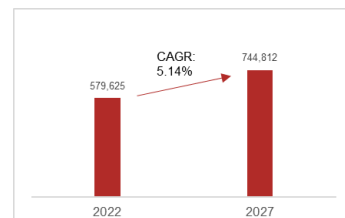


Figure 3: UHNWI development (Source: Knight Frank)

Porsche has managed the art of remaining true to original brand values and designs, while at the same time introducing technology and attaching particular importance to topics such as sustainability. According to a survey by Accenture, 64% of buyers are concerned about sustainability and look at alternative options to internal combustion engine (ICE) vehicles for their next purchase (2021). So far, they managed to inspire long-time Porsche enthusiasts and collectors as well as younger customer groups who attach particular importance to digital topics, customization, and sustainability. Porsche announced a gradual change of their portfolio from ICE vehicles to EVs, with the goal of reaching an 80% share of fully electric vehicles by 2030. In their report, Accenture also showed customers' willingness to pay a premium for sustainable

options in the automotive industry (2021). This will benefit Porsche's pricing power even more in the future and allow them to continuously retrieve higher prices year-over-year.

Another trend that benefits Porsche is the growing demand for SUVs. The global SUV market is expected to grow at an CAGR of 1.91%, reaching a market size of USD 841.9bn in 2027 (see *figure 4 and 5*; Statista, 2023). A McKinsey survey shows that around 50% of luxury-car buyers are thinking about a SUV for their next purchase. This extreme demand caused even manufacturers such as Ferrari and Lamborghini, who are originally known for their sports cars, to introduce SUV models. Even in the top luxury segment, there are manufacturers catering to this trend, such as Rolls Royce with the Cullinan and a price tag above USD 750k. Porsche's Macan and Cayenne series are both attributable to the SUV segment and are historically responsible for more than 50% of Porsche's overall automotive sales. Additionally, the share of electric SUVs is gaining momentum and is expected to be the biggest driver of the SUV demand (Guan, M. et al., 2022). Therefore, Porsche is currently working on fully electrifying the Macan and Cayenne series, while also working on a new, fully electric SUV concept even bigger than the Cayenne series, catering to the electric SUV demand in the luxury segments.

Geographically, Porsche splits its sales market into five key regions: Germany, Europe without Germany, North America excl. Mexico, China incl. Hong Kong and the rest of the world (Porsche AG, 2023). In 2022, China was the biggest region, responsible for 30.2% of sales revenue, followed by 27.2% in North America and 18.9% in Europe without Germany. China is expected to be the biggest growth driver for the luxury car market as well as the SUV market due to an accelerated increase of HNWI and UHNWIs (Guan, M. et al., 2022). Additionally, the U.S. continues to play an important role due to its large share in the ongoing SUV trend.

Porsche's strategy towards customization and technology is especially important in the Chinese market, as Chinese buyers put an emphasis on the importance of these factors when buying new cars (Guan, M. et al., 2022). Just recently, Porsche announced an expanded partnership with Google, bringing the best of both worlds into the cars providing advanced connectivity and Google services (Porsche AG, 2023).

Based on the operating environment presented above, we determined five key drivers that are responsible for Porsche's expected growth in the future. The implications in our valuation are described in the *forecast section*:

- 1) Luxury car market growth
- 2) HNWI and UHNWI growth
- 3) Porsche's stellar brand image, quality, and pricing power
- 4) The global trend towards sustainability, (B)EVs
- 5) The global trend towards SUVs

Key Risks

- Supply chain disruptions

In recent years, the automotive industry needed to overcome several challenges influencing the overall operating environment. Ranging from an overall drop in production during the Covid-19 pandemic to war breaking out in Europe.

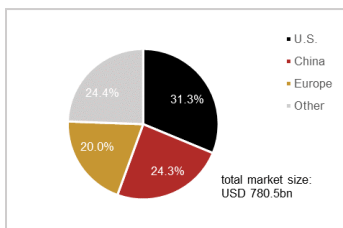


Figure 4: SUV market, 2023
(Source: Statista)

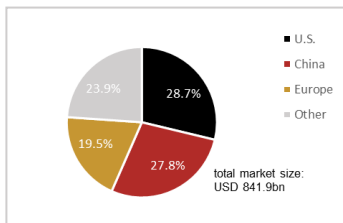


Figure 5: SUV market, 2027
(Source: Statista)

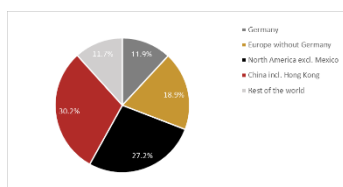


Figure 6: Revenue by region, 2022
(Source: Porsche AG annual report)

The global supply chain disruptions that first emerged during the Covid-19 pandemic and have resurfaced because of the war in Ukraine have led to significant challenges in the procurement of materials and parts. This has had a particular impact on companies that rely on an extensive network of suppliers. Porsche has around 1400 suppliers for production materials and 5400 suppliers for non-production materials. In 2020, the first year of the pandemic, these disruptions contributed to a 2.6% decline in overall industrial production compared to 2019 (De Santis, R.A., 2022). Porsche's production and sales¹ were also affected, declining compared to 2019 (276,888 to 264,989). As a result of its market position and the associated scope for pricing, Porsche managed not to lose any revenue despite the decline in sales figures. In addition, a quick recovery was achieved, and sales rose to 297,289 units sold in 2021 and 313,721 units sold in 2022. Even with these advancements, the effects of these disruptions are still felt in 2023, but less intensely. Uncertainty is expected in the future, particularly given the high costs of energy and basic materials. Porsche's sales proportion of all-electric vehicles decreased in 2022 compared to 2021, mostly because of supply problems with key components for the Taycan production. The manufacturing of BEVs is even more reliant on certain commodities and resources, such as lithium, the price of which has increased significantly in recent years (Xu et al. 2020). Risk management and price hedging as well as supplier relationships will therefore continue to play a significant role in securing production materials and prices. Ensuring the availability of necessary materials and components is key for Porsche to mitigate the impact of disruptions to the global supply chain. The company's approach to overcoming these challenges includes a strategic focus on long-term supplier relationships, which are critical to the continued production of its vehicles, particularly all-electric models such as the Taycan. These strategies are critical for Porsche to maintain its production and sales momentum in the face of current and future supply chain uncertainties.

- Semiconductor shortage

Another critical component in the automotive industry, especially for BEV production, are microchips. The automotive industry has not been spared from the shortage of semiconductors. S&P Global estimates the impact of the crisis in a decline of around 9.5 million cars that could not be produced due to chip shortages. In the first half of 2023, this impact is still estimated at 524,000 vehicles worldwide. Compared to internal combustion engines (ICE), BEVs require a significantly higher number of microchips. These semiconductor chips are crucial for the control of power conversion in electric vehicles, the development of autonomous driving technologies and the centralization of the powertrain. In 1978, a Porsche 911 had one electric control unit and eight semiconductors. An EV today requires around 5,000 – 7,000 semiconductors, depending on how sophisticated the technology is. According to estimates, semiconductors worth USD 1,400 per car will be installed by 2028, whereas this figure is currently still around USD 500 (S&P Global, 2023). The more advanced the technology, the more chips will be needed, making the design and integration of these systems increasingly complicated. Porsche Consulting has designed a framework to ensure a stable supply in the long term. This involves gathering data on the use and availability of semiconductors, long-term demand planning and establishing a direct relationship, possibly even joint ventures, with semiconductor manufacturers. In response to the overall manufacturing complexity, Porsche is also heavily involved in funding start-ups with innovative solutions to optimize this complicated manufacturing process.

¹ Units sold

Additionally, the semiconductor industry is highly centralized in terms of geography and market participants. 92% of the most advanced microchips and 60% of the less advanced microchips for further production needs are supplied by Taiwan Semiconductor Manufacturing Company (TSMC). In addition, 80% of microchips are manufactured either in Japan, China, South Korea, or Taiwan. As TSMC is a Taiwanese company, a potential conflict between Taiwan and China would again lead to extreme supply shortages of semiconductors and impact global markets.

- **China**

Looking at competitors, especially China generated several new market entrants in the EV market. These players are supported by China's government through subsidies, tax exemptions and special sales requirements for new companies (Favino, 2022). However, they mostly focus on more affordable cars; the most popular EV in China started at around USD 4,500 in 2021. Other competitors, like Tesla from the United States, or Polestar, Volvo's EV brand, were already able to produce models with better performance metrics in some cases.

China's influence goes beyond mere market entry. China is also the largest manufacturer of batteries for EVs, with CATL alone controlling more than 30% of the market share (Favino, 2022). This dominance is further emphasized by the fact that 75% of EV battery production is in China. Combined with China's control over rare earths elements and extremely short and efficient supply chains, Chinese manufacturers can exploit cost advantages of up to 20%. This currently makes every player in the EV market dependent on China to a certain extent. However, this dependency is problematic due to various arguments such as poor labour conditions or geopolitical tensions.

In response to this growing influence, various countries are taking measures to regulate Chinese involvement in their markets. For example, the U.S. imposes a 27.5% tariff on Chinese vehicles to deter Chinese manufacturers from entering the market. In addition, the U.S. government is heavily regulating partnerships with China, such as the joint venture between Ford and CATL to build a USD 3.5 billion battery factory in Michigan. India has taken a similar stance, blocking all Chinese manufacturing facilities within the country.

The European Union faces a unique challenge. With an inflexible environmental agenda that includes a complete ban on ICEs by 2035, but without adequate measures and incentives to encourage the production of EVs, the EU is in a precarious position. The relatively low tariff rate of 10% on Chinese vehicles suggests that importing EVs could become the main solution to meet market demand and domestic car manufacturers will continue to lose market share. EVs produced in China currently have an 8% market share in Europe, which is expected to grow to 15% by 2025. The European automotive industry needs to heavily invest and expand its efforts in battery production if they want to close the gap (Cornet et al., 2023).

- **Production costs**

BEVs are currently more expensive to manufacture than ICEs due to several key factors. The most expensive component of a BEV is the battery, which adds significantly to the overall price. As described above, batteries require rare and expensive materials such as lithium, cobalt and nickel, and the sourcing and refining of these materials adds to the cost. Secondly, EVs often require advanced technologies for energy management and sophisticated software for features such as autonomous driving, which further increases production costs. In addition, EVs do not yet have the economies of scale in production that ICE vehicles benefit from due to their longer established manufacturing processes and more developed supply chains. However, a recent

study by the Fraunhofer Institute for Systems and Innovation Research has shown that although EVs initially generate higher costs for the purchase and charging infrastructure, they offer considerable cost-saving potential over a long lifetime (15 years+), depending on the size of the vehicle (2023a).

Based on Porsche's performance over the last few years and the company's effective risk management, we are confident in the assumption that Porsche will continue to overcome the difficult current circumstances and will also be able to manage any future obstacles. Regarding production costs, Porsche needs to continue to leverage supplier relationships to secure both material supply and prices. It will also need to further invest into R&D to reach more cost efficiencies in production like shared base components.

Opportunities

Both the luxury car market and the EV market will experience strong growth in the coming years. Porsche will therefore have the opportunity to position itself even more clearly in these markets in the coming years.

Porsche, on its path to electromobility and sustainability, will continue to build models that remain true to their line, without compromising on quality and performance, and continue to excite buyers. The company is well equipped to become a key European player in the (luxury) EV market. It has already proven to be on the right track with the launch of the Taycan series. Further steps must now follow to successfully establish Porsche in the (luxury) EV market.

Production wise, concrete plans for this are already being implemented, with the full electrification of the 718 series, as well as the indicated development of a new full-electric SUV (Guan et al., 2022). In 2022, Porsche opened its first production site outside of Europe in Malaysia, to better cater to the Asian market. However, unlike many competitors, Porsche still mainly produces in Germany. This offers unrivalled opportunities to attract future EU- and German-based subsidies, aiming for more sustainable cars and the EU's goal of banning ICE vehicles by 2035.

Porsche's general R&D efforts, based in Weissach, Germany, will play a major role in the company's future success. By installing a R&D hub in Shanghai, Porsche took the right steps to better understand its biggest market, China, and develop products that fulfil the specific Chinese demands. Overall, Porsche will continue to streamline production processes and reach a shared base for components of similar models, realizing better economies of scale and overall faster production times. Additionally, Porsche already heavily invests in developing high-tech batteries as well as the battery production cycle itself. The main goal is to build high-voltage batteries that can be recycled into a second use cycle and a general improvement in terms of efficiency.

From an investing perspective, Porsche authorized higher budgets to focus on innovating areas like recycling, waste reduction, production efficiency and sustainability (Porsche AG, 2023a). The company's efforts in cooperation with partner firms to optimize the recycling process of EV batteries presents another step towards a more sustainable value creation, for example by recycling valuable raw materials (Porsche AG, 2023a). Through investments into their charging network, using premium partners, Porsche can ensure that the network is globally extended and provides convenient solutions for their customers. By partnering with elite establishments such as hotels, restaurants, golf clubs or marinas, Porsche benefits by receiving free marketing at elite locations, which they in turn advertise as charging options in the navigation system.

Another aspect will be the balance between tradition and technology. As technology and

connectivity become more and more important, this is another opportunity to position the company for the future. At the same time, it will be important to retain traditional design elements and give them sufficient importance, as these often trigger emotions in buyers and can determine the success of a model series. Finally, we must not forget the appeal and prestige the Porsche brand carries; therefore, many stakeholders will closely watch Porsche's future developments, especially towards EVs.

To summarize, there are currently many players in the electric vehicle market, from start-ups to long-established car manufacturers. However, we expect the market to consolidate in the coming years. This is due to the significant resources required for R&D, production, and regulation, which favours larger, established companies that can quickly adapt to market changes. Based on this we attest Porsche a competitive advantage in the coming years. They are already on the right track to align their product portfolio for different markets and demands. Through the R&D measures mentioned above, Porsche will make relevant progress and create new models that will continue to evoke emotions in their customers and increase their sales in the long term.

Value Drivers and Forecasts

Revenues

Porsche's revenue is split into revenue from the automotive segment and revenue from the financial services segment. Historically (FY2018-2022), the automotive segment has always generated more than 90% of Porsche's total revenue. Revenue from the automotive segment will remain the most important value driver for Porsche.

Since the introduction of the 718 series in 2017, which combines the Boxster and Cayman series, Porsche has offered a total of six model series. These include the Macan and Cayenne model series (both SUVs), the Taycan model series (BEV), the Panamera model series (saloon) and the 911 and 718 model series (sports cars). We have used a mixture of price trends and the number of units sold to forecast the automotive segment. Based on the five main drivers for Porsche (luxury car market growth, HNWI/UHNWI growth, brand image, global trend towards sustainability and global trend towards SUVs), we have derived effects for both price development and the number of vehicles sold.

In general, higher prices will be necessary in the future to compensate the general cost development, especially in relation to material prices and the production of EVs (*see cost section*). On the price side, we therefore expect the greatest effect to come from cost coverage and Porsche's market position and pricing power. Porsche's consistency in terms of quality, tradition and ability to evoke emotions has enabled the car manufacturer to build a loyal, constantly growing customer base willing to pay high prices. This is followed by the effect of the growing luxury car market and the increasing demand for luxury cars. In this market, generally higher prices can be demanded due to the use of high quality materials, advanced technology, excellent craftsmanship and brand image. We expect prices to rise continuously, partly due to demand and partly due to rising production costs and extra services such as personalization. Through Porsche's market position, the company will be able to capitalize on these trends and grow in the coming years.

We attribute the similar effect to the global trend towards SUVs and sustainability and the growing number of (U)HNWI. This is due to the fact that Porsche has to compete in all these areas. In the

(U)HNWI market, Porsche competes with even more exclusive car manufacturers, such as Lamborghini or Ferrari. In the EV market, Porsche is competing with manufacturers from China who have more efficient supply chains or manufacturers who have dedicated themselves entirely to EVs, such as Tesla. In the SUV market, Porsche competes against manufacturers trying to establish themselves more in the luxury segment, like Mercedes-Benz and other luxury manufacturers entering the SUV market to extend their product offering, like Lamborghini or Ferrari to. Nevertheless, we expect Porsche to continue to operate successfully in these markets through its strategic focus combined with its positioning in the luxury segment.

Price development (p.a.)	Effect	Macan	Cayenne	Taycan	911 Series	Panamera	718 Series
Luxury car market growth	0.50%	yes (0.5x)	yes	yes	yes	yes	yes (0.5x)
Cost compensation + Porsche brand	1.00%	yes	yes	yes	yes (2x)	yes	yes
SUV trend	0.25%	yes	yes	no	no	no	no
HNWI / UHNWI growth	0.25%	yes	yes	yes	yes	yes	yes
Sustainability trend	0.25%	no	no	yes	no	no	no
	2024F	1.75%	2.00%	2.00%	2.75%	1.75%	1.50%
	2030F	2.00%	2.25%	2.00%	2.75%	2.00%	1.75%

Table 2: Price development
(Source: own analysis)

In our forecast, we have taken a slightly more conservative approach to the development of the number of cars sold. This is primarily due to the current macroeconomic situation and the gradual conversion of model series to electric engines. It remains to be seen how fully electric Cayenne or 718 models, for example, will be accepted by the market. We assume that a substitution effect will set in over the next few years and that Porsche will gradually replace ICE vehicles through EV sales. In addition, the main drivers will also ensure that Porsche will sell more cars from year to year. Porsche's brand image, together with the growing luxury market and the increasing demand for SUVs, will ensure that the Cayenne and Macan series will remain extremely important models. Historically, these two model series have been responsible for over 50% of the cars sold. Since the launch of the Taycan series in 2019, it has seen an exorbitant increase in sales (3y CAGR: 527.45%). These growth rates will be slowed down in the future by the introduction of further EV models, for example fully electric 718 models. Should the other EVs in general come close to replicating the success of the Taycan, Porsche will be able to generate significant value for its shareholders.

Units sold development (p.a.)	Effect	Macan	Cayenne	Taycan	911 Series	Panamera	718 Series
Luxury car market growth	0.50%	yes	yes	yes	yes	yes	yes
Porsche brand	0.50%	yes	yes	yes	yes	yes	yes
SUV trend	0.15%	yes	yes	no	no	no	no
HNWI / UHNWI growth	0.25%	yes	yes	yes	yes	no	no
Sustainability trend	0.10%	no	no	yes (5x)	no	no	no
	2024F	1.40%	1.40%	1.75%	1.25%	1.00%	1.25%
	2030F	1.50%	1.50%	1.25%	1.25%	1.10%	1.35%

Table 3: Units sold development
(Source: own analysis)

Porsche's financial services segment generates revenue mostly through car financing and leasing contracts. Historically (2019-2022), the share of total sales revenue attributable to the financial service segment has always been below 10%. Porsche will focus on developing its EV portfolio and extending its revenue through the automotive segment. Financial services are merely a by-product that is necessary to be able to sell vehicles through financing options. Therefore, we do not expect any significant developments in the financial services segment that would justify an extraordinary increase in value. Due to the overall increasing number of cars sold, the number of financing contracts outstanding will inevitably increase as well. We expect the average value per contract to grow at 2% p.a., to account for the EU's inflation target (European Central Bank, 2022). In our forecast period, the financial services revenue share will decrease to around 7% of the total

sales revenue. Overall, we forecasted revenues to grow from EUR 43,641m in 2024 to EUR 56,967m by 2032. This represents an overall revenue increase of 30.5% and a CAGR of 3.4%.

Revenue share (EUR m)	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Automotive revenue	40,247	41,640	43,082	44,574	46,119	47,718	49,440	51,232	53,083
% of total sales revenue	92.2%	92.3%	92.5%	92.6%	92.7%	92.8%	92.9%	93.1%	93.2%
Financial services revenue	3,393	3,451	3,510	3,570	3,631	3,692	3,755	3,819	3,884
% of total sales revenue	7.8%	7.7%	7.5%	7.4%	7.3%	7.2%	7.1%	6.9%	6.8%
Total Sales Revenue	43,641	45,091	46,592	48,144	49,749	51,410	53,196	55,051	56,967

Table 4: Revenue shares
(Source: own analysis)

We expect the inflation rate to return to the ECB's target of 2% p.a. by 2027. After deducting the inflation rate, Porsche reaches a steady state with a long-term growth rate of 3.5% p.a. in 2030.

Growth rates (yoy)	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Nominal growth rate	2.9%	3.3%	3.3%	3.3%	3.3%	3.3%	3.5%	3.5%	3.5%
Inflation rate	3.5%	3.0%	2.5%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Real growth rate	-0.6%	0.3%	0.8%	1.3%	1.3%	1.3%	1.5%	1.5%	1.5%

Table 5: Growth rates
(Source: ECB, own analysis)

Costs

The most uncertain driver in terms of forecasting is the cost of materials. Material prices have experienced an extreme increase in recent years. In addition, there is the constantly growing demand for specific materials to produce EVs. The spot prices of these partly very rare elements have been subject to extreme fluctuations in recent years. These materials will play an increasingly important role for Porsche in the future, on their mission to gradually transform their product portfolio into 80% EV by 2030. The future development remains to be seen, but these materials are likely to become increasingly expensive due to global demand. One measure to mitigate this trend is long-term partnerships with suppliers and the resulting improved price security. Mercedes-Benz, for example, concluded a supply contract with Rock Tech Lithium for 10,000 tons of lithium hydroxide per year in October 2022 (Fraunhofer ISI, 2023b). Some companies go one step further and invest directly in mining companies, such as Ford, with a USD 4bn investment in an Indonesian nickel mine (Fraunhofer ISI, 2023b). Porsche will also secure long-term supply contracts as already mentioned. In addition, we see potential in Porsche's R&D department, particularly in the form of developing more efficient batteries, as well as recycling and reusing materials. Nevertheless, we have included premiums for the general market uncertainty and rising demand for materials in our forecast.

We expect R&D to play a particularly important role in the company over the next few years, which will increase R&D costs in the coming years. This trend can be supported by several aspects: Improving sustainability, growing EV production, more efficient production, and an ever-increasing need for technology. Porsche is constantly working on improving the company's CO₂ footprint over the entire life cycle of its products. The car manufacturer aims to push ahead with the development of more efficient batteries. Particular attention will be paid to the more efficient use of critical materials and the batteries used in EVs. Research is currently being carried out with partners into recycling options, with the aim of producing batteries that can be recycled for a second use cycle. At the same time, they are involved in the development of alternative fuels (eFuels). We expect Porsche to increase the usability of various basic components for similar models in the future. This can lead to cost savings in the production process. In addition, the increased demand for personalization and networking means that technological details must be constantly adapted and improved to meet requirements.

For Porsche to continue to build high-quality cars and live up to its brand standards, it needs great people. We are therefore certain that it is in Porsche's interest to retain talent in the long term as well as to attract new talent. Porsche will continue to pay above-average salaries to be able to

continue to expect maximum commitment from its staff in the face of increasing production costs. We expect the production benefits from R&D efforts and investments to be partially offset by the general increase in demand, as well as the increased demand for personalized vehicles and higher technology levels. Historically, the average number of units sold per employee was around 8 vehicles. We do not expect any significant improvements in the forecasting period because the production processes are already highly automated. Porsche will therefore have to continue to hire additional staff in the future to meet the rising production requirements.

Growing production and increased R&D expenditure require corresponding investments in property, plant, and equipment. We expect increased investments in the coming years, which will grow in line with revenues. These include, for example, the expansion of production facilities, the expansion of the global footprint and equipment for the R&D centres. In addition, Porsche will invest in its charging network for EVs in the coming years to expand it worldwide. The network currently comprises over 4,200 charging stations in 75 countries, with more than 2,600 located in Europe. Porsche is working with selected partners and aims to expand this network to over 7500 charging stations by 2025.

Overall, we do not expect a significant improvement on the cost-side in the following years, because of needed investments, raw material price uncertainty and personnel costs.

Cost forecast (EUR m)	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Material costs	(20,655)	(21,572)	(22,531)	(23,535)	(24,587)	(25,438)	(26,324)	(27,243)	(28,196)
R&D costs	(2,618)	(2,705)	(2,796)	(2,889)	(2,836)	(2,776)	(2,713)	(2,642)	(2,564)
Personnel costs	(5,663)	(6,008)	(6,342)	(6,696)	(7,069)	(7,462)	(7,878)	(8,317)	(8,780)
Depreciation & amortization	(3,841)	(3,969)	(4,101)	(3,531)	(3,649)	(3,771)	(3,902)	(4,038)	(4,178)
Other	(4,931)	(5,095)	(5,265)	(5,440)	(5,622)	(5,809)	(6,011)	(6,221)	(6,437)
Total costs	(37,710)	(39,349)	(41,035)	(42,091)	(43,762)	(45,257)	(46,828)	(48,460)	(50,156)
<i>% of revenue</i>	<i>86.4%</i>	<i>87.3%</i>	<i>88.1%</i>	<i>87.4%</i>	<i>88.0%</i>	<i>88.0%</i>	<i>88.0%</i>	<i>88.0%</i>	<i>88.0%</i>

Table 6: Cost forecast
(Source: own analysis)

Valuation

Scenario analysis

Based on the current macroeconomic situation and Porsche's market positioning, we have prepared a scenario analysis by defining three scenarios and using the weighted average of these scenarios as the basis for our valuation. Our base case scenario is based on the assumptions and forecasts presented above. For the best-case and worst-case scenarios, we have identified drivers that we would expect to have a potential impact on Porsche's business. We have differentiated between macroeconomic, industry-specific, and company-specific events. Macroeconomic events include the Ukraine war, material and energy costs and inflation. If the Russia-Ukraine conflict is resolved soon, we expect sales to develop positively, especially in Russia. At the same time, we would expect an improvement in the cost structure related to materials and distribution. Should current material and energy prices normalize more quickly, this would also have a positive impact on Porsche's costs. Finally, if inflation reaches the 2% target more quickly, we expect sales to increase as financing becomes cheaper. At the same time, Porsche would have to pay less inflation compensation in wage adjustments. However, if these events worsen, we expect to see reverse effects that will impact Porsche's sales and increase the cost of materials, distribution, and personnel.

For the industry-specific events, we have developed scenarios based on the shortage of semiconductors and the supply chain. If Porsche can quickly enter into significant partnerships

with suppliers and establish a more efficient supply chain, we expect a positive impact on material and distribution costs. However, the effects could also develop in a negative direction and raise costs if the market for key materials deteriorates, or it becomes more difficult to improve the supply chain. Lastly, the company-specific events look at Porsche's goal to transform its product portfolio to 80% (B)EVs and the continuation of its pricing power. In each case, we would expect to see an impact on sales and R&D costs.

These effects were added and charged to the corresponding positions of the base-case scenario. The weighted scenario consists of 70% base-case, 15% best-case and 15% worst case scenario and forms the foundation for our valuation.

Discounted Cash Flow

To value Porsche we first performed a discounted cash flow (DCF) valuation, using the weighted average cost of capital (WACC). In our valuation, we used European yields for AAA-rated bonds provided by the European central bank (2023) as the risk-free rate. We retrieved a levered beta β_e of 0.987 from Bloomberg², which we then unlevered using the tax rate and the D/EV ratio as calculated (see debt section for more information). The beta provided by Bloomberg most accurately reflects Porsche's market volatility as other methods have resulted in significantly lower betas. The market return was calculated by adding a market risk premium of 5% (Damodaran, 2023) to the retrieved risk-free rates. For the cost of debt, we used the bonds issued by Porsche Automobil Holding SE as a proxy, as Porsche itself has not issued any corporate bonds. Using the inputs described above, Porsche's target D/EV ratio of 25.3% and a tax rate of 30% we calculated a WACC for each year in the forecast period (see Appendix 2 for more information).

DCF key components (EUR m)	
Sum of all discounted cashflows	21,065
Core terminal value (PV)	98,156
Core business value	119,221
Non-core business value	4,976
Enterprise value	124,197
Net debt	25,708
Minority interest	8
Equity	98,480
Total shares available (m)	911
Price per share (€)	108.10
Total discounted value of extra dividends	59
Price per preferred share (€)	108.23

Table 7: DCF overview
(Source: Porsche AG, own analysis)

Porsche has a total of 911m shares outstanding, representing its subscribed capital (Porsche AG, 2022). These 911m shares are divided into 455.5m ordinary shares that carry voting rights and 455.5m preferred shares that carry no voting rights but are entitled to an extra dividend of EUR 0.01 per share (Porsche AG, 2022). During its IPO, Porsche only listed the 455.5m preferred shares (Porsche AG, 2022). The ordinary shares are currently held by Volkswagen AG and Porsche SE (Porsche AG, 2022). In our DCF valuation, we therefore derive a price per share for the listed 455.5m preferred shares. This share price includes an extra value of EUR 58.09m, to account for the extra dividend each preferred share is entitled to.

Our DCF analysis obtained a preferred share price of EUR 108.23 for Porsche AG. We also performed a sensitivity analysis, by increasing and decreasing the terminal growth rate of 3.5% and the calculated WACCs by 50bps and 100bps.

		WACC				
		-1%	-0.5%	as calculated	+0.5%	+1%
Terminal Growth Rate	2.5%	116.58	92.42	75.45	62.87	53.16
	3.0%	148.21	112.33	88.98	72.56	60.40
	3.5%	203.08	142.92	108.23	85.65	69.78
	4.0%	321.63	196.00	137.83	104.28	82.45
	4.5%	768.10	310.67	189.17	132.92	100.48

Figure 7: Sensitivity analysis
(Source: own analysis)

² Adj. Beta (estimated future beta by Bloomberg)

Recommendation

We value Porsche at EUR 108,23 per share using the DCF approach. This valuation is supported by further valuation techniques using the multiples approach. Porsche is therefore undervalued and holds a potential upside of 34.22%³ as of the valuation date (19th Dec 2023) – we therefore assign Porsche AG (ticker: P911) a strong buy signal.

The following *figure 8* shows an overview of all valuation results presented in this report.

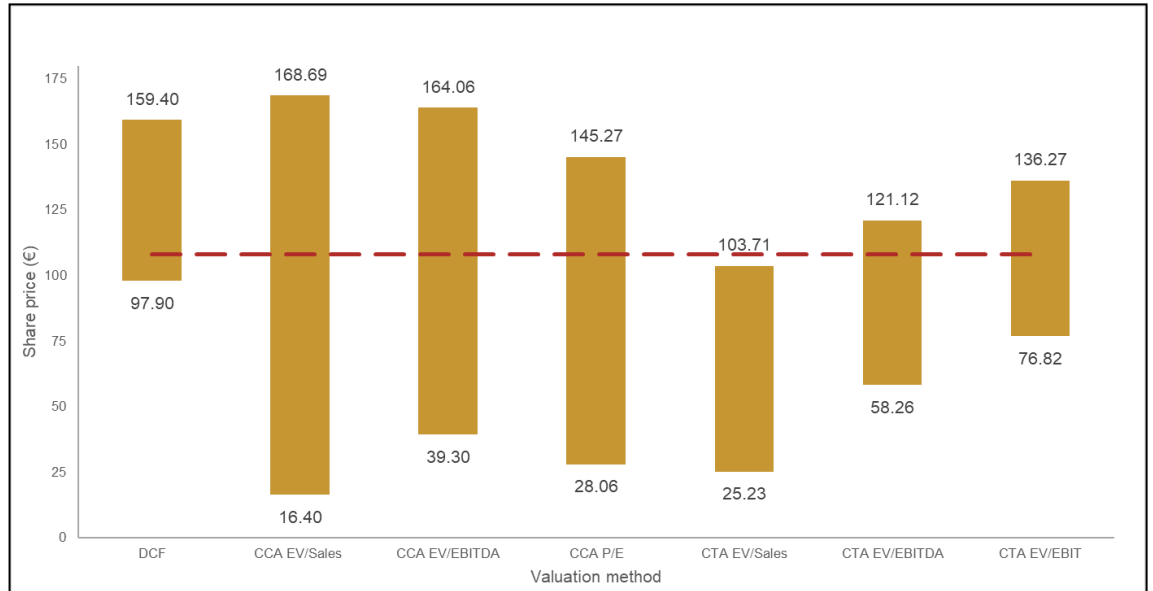


Figure 8: Valuation results
(Source: own analysis)

³ Porsche AG, closed share price retrieved from <https://investorrelations.porsche.com/en/share/> on 19th Dec 2023

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Appendix

Appendix 1: Overview market share development

Revenue per Model		Model	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		Macan	5,634	6,068	6,500	6,707	6,920	7,139	7,366	7,600	7,841	8,118	8,404	8,701
		Cayenne	8,830	11,951	12,285	12,534	12,964	13,408	13,868	14,343	14,835	15,396	15,978	16,583
		Taycan	4,851	4,076	5,434	5,639	5,853	6,074	6,304	6,543	6,790	7,013	7,242	7,480
		911 Series	5,580	6,271	8,454	8,795	9,150	9,519	9,903	10,302	10,718	11,150	11,600	12,068
		Panamera	3,980	4,470	4,516	4,641	4,769	4,901	5,037	5,176	5,319	5,486	5,657	5,833
		718 Series	1,250	1,604	1,880	1,932	1,985	2,040	2,097	2,155	2,215	2,278	2,349	2,418
Price Category	Min Price	Max Price	Macan	Cayenne	Taycan	911 Series	Panamera	718 Series						
Distribution per Model	0	80000	65%	0%	0%	0%	0%	0%	60%					
	80000	150000	35%	80%	80%	50%	70%	40%						
	150000	300000	0%	20%	20%	45%	30%	0%						
	300000	500000	0%	0%	0%	5%	0%	0%						
	500000	1000000	0%	0%	0%	0%	0%	0%						
Revenue Porsche	Min Price	Max Price	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	0	80000	4,412	4,907	5,353	5,519	5,689	5,865	6,046	6,233	6,425	6,644	6,872	7,106
	80000	150000	18,993	21,851	24,590	25,305	26,182	27,091	28,031	29,005	30,013	31,094	32,218	33,380
	150000	300000	6,441	7,368	8,703	8,984	9,311	9,650	10,002	10,366	10,744	11,145	11,561	11,993
	300000	500000	279	314	423	440	457	476	495	515	536	558	580	603
	500000	1000000	0	0	0	0	0	0	0	0	0	0	0	0
Market Share Porsche	Min Price	Max Price	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	0	80000	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%
	80000	150000	14.1%	15.0%	15.6%	14.9%	14.2%	13.6%	13.1%	12.5%	12.0%	11.5%	11.0%	10.6%
	150000	300000	23.9%	24.9%	26.7%	25.1%	23.6%	22.3%	21.0%	19.8%	18.6%	17.6%	16.6%	15.6%
	300000	500000	4.1%	4.2%	5.2%	5.0%	4.7%	4.5%	4.3%	4.1%	3.9%	3.8%	3.6%	3.4%
	500000	1000000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Appendix 2: Overview WACC calculation

WACC	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Cost of Equity	7.7%	7.3%	7.0%	6.9%	6.8%	6.8%	6.8%	6.8%	6.8%
Cost of Debt	2.9%	3.1%	3.4%	3.6%	3.8%	3.9%	4.0%	4.1%	4.1%
E/EV	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%	74.7%
D/EV	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%	25.3%
Tax Rate	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Core WACC	6.27%	5.98%	5.83%	5.78%	5.78%	5.80%	5.82%	5.83%	5.83%